ILLINOIS MEDICAL JOURNAL

THE OFFICIAL ORGAN OF
THE ILLINOIS STATE MEDICAL SOCIETY

ENTERED AT THE SPRINGFIELD POSTOFFICE AS SECOND-CLASS MATTER

VOL. XXII SPRINGFIELD, ILL., NOVEMBER, 1912 No. 5

ORIGINAL ARTICLES

SOME OF THE ACCIDENTS AND COMPLICATIONS ATTENDING OR SHORTLY FOLLOWING THE EXTRACTION OF SENILE CATARACT *

CASEY WOOD, M.D.
CHICAGO

Although this subject may seem to be hackneyed, yet it must ever continue to be one of prime importance to the ophthalmic surgeon. With all the improvement in technic and with all our increasing experience of various forms of the cataract operation, I cannot imagine a time in which the dangers attending the removal of the lens will not occupy the serious attention of the surgeon.

In this short paper I do not attempt to enumerate all the calamities of cataract removal, nor do I make any effort to present the prophylaxis and therapy of the abnormal conditions described. I would feel grateful, however, if the section members will give us their experience of them.

The causes of most of the accidents and complications that arise during and after cataract extraction are the result not solely of defects in the manipulative skill of the surgeon, but quite as often to lack of control on the part of the patient. Other causes of trouble are undesirable local conditions, immaturity of the cataract, the septic condition of the eye or its appendages, or lack of the usual aseptic precautions. Whatever has determined the unfavorable outcome of an operation it is important that the student learn whether it has resulted from ignorance or carelessness on the part of any of those specially involved in the extraction.

An idiosyncrasy against belladonna in the form of atropin irritation, dermatitis and conjunctivitis, shows itself in swelling of the conjunctiva and roughness of the palpebral skin. It is never accompanied by pain, but generally is attended by some itching and ocular discomfort. It is commonly observed several days after the first instillation of the drug and may be associated with considerable thickening of the skin surface

* Read at the Sixty-Second Annual Meeting of the Illinois State Medical Society, at Springfield, May, 1912.

and a seromucous discharge from the eye. It is an alarming sign when it occurs after cataract extraction, especially to one who has not previously encountered it, but is not, fortunately, as serious a complication as it appears. The mydriatic should be changed to duboisin or hyoscin, the dose reduced to the minimum and a simple ointment applied to the roughened lids.

Since the introduction of adrenalin and cocain in extraction operations it is not uncommon after the expulsion of the lens to note corneal areas that have lost some of their protective covering. This result is undoubtedly due to the action of these remedies—especially of the cocain—in softening the anterior epithelium so that even stroking the cornea with the delivery spoon now and then suffices to detach portions of it. As a rule no serious consequence follows this accident, yet it cannot tend to the welfare of the eye and should be avoided by using no more of the local anesthetic than is necessary, by instructing the patient to keep his eyes closed during its action and by avoiding too much pressure on the cornea during the lens delivery.

In passing, let me say that in my judgment, *one drop only* of a 4 per cent. solution of cocain combined with 1 per cent. holocain dropped into the eye every three minutes for fifteen minutes (when the operation should begin) gives the most complete and least harmful local anesthesia for cataract extraction.

It occasionally happens that after the puncture or counter-puncture, the surgeon discovers that he has inserted his knife upside down. It will be found that this accident is variously treated by different authorities. Knapp recommends that the knife should be turned on its long axis so as to entirely reverse its position, and thus to continue the section. I had this exasperating accident happen to me once when using a long and quite thin knife on a deep-set globe, and I was able to follow Knapp's suggestion. On the other hand, I do not see how it is possible with a Graefe knife of average thickness, to accomplish this feat without considerable loss of vitreous and much damage to the cornea. Under these conditions it is better to withdraw the knife and wait until the original wound has healed.

Melville Black has invented a knife intended to meet this contingency. It is the usual cataract knife with a blunt point, which is inserted into the original corneal opening with the proper edge up and the section completed.

In simple extraction the iris occasionally falls in front of the knife. This complication generally arises as the result of improper manipulation of the instrument and usually when the cutting plane has been altered. In most cases it is best to proceed with the operation even though, as a consequence, an irregular form of iridectomy be done.

If I were asked to name a single source for most of the evils following the removal of the lens I would say a too small corneal or sclerocorneal incision. A restricted outlet for capsular and lenticular tissues spells a dangerous traumatism, iridic hernia, secondary cataract, postoperative iritis and other forms of a lingering convalescence. One should make a

sufficient, even a generous, primary incision; and it is better to make it too large than too small.

Experienced operators are generally conscious that they have not made the opening in the eye-ball large enough for the extrusion of a large lens as soon as the corneal incision is complete, but beginners may not be aware of that fact until an attempt is made to extract the lens. When the lens cannot, with moderate pressure, be removed through the opening, it is better to enlarge it with scissors or Black's blunt-pointed knife than to bruise the tissues and detach soft matter by prolonged efforts to expel the cataract.

When the point of the knife is not properly entered to make the puncture, a split cornea is very likely to happen. Of course, this mishap endangers the success of the operation and invites all kinds of subsequent complications. Generally the operator notices the mistake and will be able to withdraw his knife before the anterior chamber is entered.

Another form of "split cornea" occurs when the counter-puncture is made. The point of the knife should be entered a little back of the apparent limbus, as the light refraction gives it the appearance of being thrust farther forward than it really is. When a badly placed section is made in the cornea the wound edges do not heal kindly or properly. Not only is there much operative astigmatism, but a wound infection of greater or less degree is likely to follow.

When too much cocain has been used, or in aged or weak subjects, a falling in of the cornea may occur, sometimes before, sometimes after, the expulsion of the cataract. At the first stage of the operation it need not embarrass the operator, but if the collapse happen *after* the removal of the lens a good plan is to fill the contracted chamber with warm, sterile, normal salt solution, and this step may be carried out as a part of the irrigation of the anterior chamber after a preliminary removal of cortical remains.

When a conjunctival flap is made there is always more or less bleeding from the severed sclero-conjunctival vessels. This accident, which not infrequently happens, especially if the flap be a large one, is responsible for a most objectionable feature in operations done with a conjunctival flap. I believe that undue bleeding is also the result of prolonged, excessive cocainization and the too early use of suprarenal preparations. Better avoid the use of adrenalin until the last, or second last, drop of cocain is instilled. Then the hemostatic effect on the eye will be obtained at the proper moment, and there will be less secondary enlargement of the blood-vessels, which I feel sure almost always follows the use of these styptics.

As a choice of evils it is better not to manipulate the lips of the wound too much in an effort to expel blood from the anterior chamber. After making a conjunctival flap, the whole eye should be gently flooded with warm boric acid solution, and the blood, in all its forms, coaxed out of the eye with "dabs" of cotton or by the use of the anterior chamber syringe. A small quantity of blood in the anterior chamber soon becomes absorbed and does little harm except to obscure, for the time, the intra-

ocular field of operation. Sometimes, however, it becomes organized and forms one variety of after-cataract. In that case the use of atropin is indicated to prevent posterior synechiæ and dionin to promote absorption of the deposit.

An insufficient cystotomy is often a serious matter, but may generally be prevented by using a very sharp or needle-pointed cystotome (better the former), entering it carefully and holding it firmly. Sometimes, even with the greatest care, the surgeon may not discover that he has to deal with an unusually tough capsule until the lens refuses to be expelled from its bed. In such cases it is best not to make too many efforts at cystotomy, but to use a pair of capsulotomy forceps provided with very sharp teeth. The instrument of Couper or Tooke will be found effective. If these fail the extraction should be attempted as for the operation in the unruptured capsule; although a hook or some other traction instrument may also be employed—but with care.

In his anxiety to remove as small a portion of the iris as possible, even a careful operator may find after the use of the scissors that he has made a "button-hole" opening in that membrane. This generally follows the seizure of the iris too near its base. He may elect to leave it alone or an iridectomy can still be carried out by passing in a Tyrrell's hook, drawing out the little band of uncut tissue and snipping it with the scissors.

In this connection let me advocate the concentrated artificial oblique illumination for the cataract operation as well as for every procedure that requires the distinct definition of minute details of the cornea and in the anterior chamber. Knapp — our master in the extraction of cataract — employed this method and it is, as you know, part of the equipment of many of the largest eye clinics at home and abroad.

In St. Luke's Hospital, Chicago, for example, we have used the Nernst light in this way with the greatest satisfaction. The isolation and clear definition of minute deposits, of faint opacities and of microscopic fibrils and strands of tissue in the anterior chamber (or deeper) is of signal assistance to the operator.

Prolapse of the iris occurring immediately after the extraction generally means tags of capsule or vitreous between the lips of the wound. A fine, fibrillar, capsule remnant may hold the iris in this fashion and elude the curet or spatula used to free it.

Swanzy recommends the routine search for such capsular, vitreous or cortical remnants. He passes the iris forceps into one angle of the incision and carries it along the whole length of the wound, repeatedly opening and closing it, for the purpose of engaging and drawing out any tags that may be found. When caught, these are pulled out and cut off with scissors. Swanzy, in this way, has found capsule or lens fibers in the wound in about 25 per cent. of all the cases examined by him.

Prolapse, or hernia, of some part of the iridic tissues is more common in the simple than in the combined operation, but in either procedure may be followed by inhealing or incarceration of the iris as a serious after-complication.

When prolapse occurs it almost invariably shows itself during the first day after the extraction. This fact justifies the careful examination of the eye-ball twenty-four hours after the completion of the operation. Then, again, better results probably flow from the immediate treatment of early prolapse, as well in a mere linear adhesion to some part of the wound edges as in extrusion of one or more knuckles or folds of iris.

The causes of prolapse are chiefly injury to the parts, or any violence that may reopen the wound. Sneezing, coughing, straining at stool and vomiting are among these, as well as accidental blows on the dressings, finger thrusts, squeezing of the lids, sudden movement in or out of bed and undue pressure of the bandage, mask or shield, etc. Sometimes the normal intraocular pressure exerted by the mass of the vitreous on the iris appears to be the only explanation of some forms of prolapse.

Extreme care should be exercised in removing the dressings at the first few inspections of the eye following an extraction, because, as Swanzy and others have shown, the iris may be washed or pushed into the wound by the sudden outflow of aqueous induced by the opening of the lids and the consequent disturbance of the wound edges. This fact brings home to one the reasons for the numerous operations devised by operators to provide such a sluice-way (iritomy, iridotomy) for the escape of aqueous as will permit effective drainage without carrying the iridic tissues with it. It explains the more frequent occurrence of prolapse in the simple operation, as well as the value of the conjunctival flap in all cataract operations.

Escape of vitreous at any stage of cataract extraction generally means rupture of the capsule, hyaloid membrane or suspensory ligament, combined or not with a fluid vitreous and increased ocular tension.

The pressure that excites it may, however, be external, such as by the lids, fingers, dressings or instruments. Sometimes the contraction of the straight muscles may be responsible for the accident.

Sometimes the vitreous may present between the lips of the wound without actually entering it or without any subsequent escape of the fluid.

Loss of vitreous most frequently attends or follows the delivery of the lens, although it may take place as soon as the opening in the eye-ball is large enough for its exit. It rarely occurs during the healing of the wound or after it has closed.

If the counter-puncture be too deep, or too peripheral a section has been made, the zonula is deprived of its usual support and loss of vitreous is all the more probable. Prominent eyes, as in high degrees of myopia or exophthalmus, are more liable to this accident than those normally set, mainly because the lids, in contracting, have a greater purchase on the globe.

The most common immediate causes of vitreous loss are spasms of the orbicularis brought about by anything that makes the patient "squeeze up" the eye; too marked use of the fixation forceps; undue pressure on or dragging of the capsule forceps or cystotome; a prolonged or too rapid section; an unexpected upward rotation of the eye when an instrument

is in the anterior chamber and too much force employed in an attempt to expel cortical matter or capsular remnants.

Postoperative iritis, especially its severer forms, is probably always associated with irritation or inflammation of the rest of the uveal tract. It varies greatly in intensity, from the simple form, due to mechanical irritation of the iris from retained lens matter, to the most pronounced cases in which direct infection is the evident source of the inflammation.

Among other causes are too long or too forcible irrigation of the anterior chamber, or lavage with any fluid but sterile, dust-free, normal salt solution at the body temperature, operative traumatism, such as occurs in tearing or bruising the iris with dull instruments, forcible expression of the lens through a too small section and dragging on the iris by the forceps when the patient suddenly rotates the globe; injury to the eyeball during careless nursing, by a badly fitting mask or dressing, by a finger thrust or by some injury received during sleep; finally and more rarely, as part of the recrudescence of a diabetic, syphilitic or rheumatic process.

The symptoms of iritis generally set in several days after the operation — the later the milder. The disease persists for a variable period, most cases recovering under atropia, hot applications, Credé's ointment and dionin.

Postoperative iridocyclitis may generally be regarded as a more pronounced form of infection than that just described, and is, as a rule, followed by loss of useful vision. Cases present, within twenty-four hours after the extraction, the symptoms of acute iritis soon followed by marked evidence of an intraocular inflammation, i. e., a blurred, swollen iris with exudates at its margins.

In spite of all treatment (which is substantially that suggested in the severer forms of iritis) the pupil generally fills with fibrinous masses, there is an updrawn pupil and, finally, an *iris bombé*. Now and then, however, the eye becomes quiet and some form of iridotomy may eventually be instrumental in restoring a fair amount of sight.

In spite of our boasted improvements in aseptic and antiseptic surgery, infection of the operative wound remains the most serious complication of cataract extraction. Although, as in advanced anemia, arteriosclerosis, lachrymal disease, etc., one is obliged to run certain unavoidable risks, yet microbic invasions of the incision are, after all, the *bête noire* of the surgeon. The occasion may vary from the moment of the puncture that opens the anterior chamber to weeks or months after the operative wound has healed, but the admission of bacteria or toxins, or both, to the interior of the eye will generally account for the majority of postoperative disasters. It is not intended to deny the verity of endogenous infection or to minimize the lowered resistance of the tissues that is not infrequently encountered in old people with nephritic and other organic changes, but these facts should not be allowed to cloak a more important factor — septic infection.

The most common predisposing causes of bacterial invasion are prolapse of the iris, prolapse of the vitreous and the incarceration of portions

(however minute) of these and other tissues between the lips of the wound. Such accidents, as well as an irregular corneal cut, prevent that clean, smooth and early adhesion of the incisional margins that is the best guarantee of a successful operation.

Suppuration of the external wound is by far the most serious calamity that can involve the eye operated on, as it almost always terminates in panophthalmitis and complete loss of sight. Following the rule of dangerous postoperative infections the involvement of the eye shows itself within a few hours after the patient is put to bed, and the signs of the accident are quite marked. The pain in and about the eye is severe, the swelling of the upper lid is pronounced, the globe is very tender, the secretions are copious and the cornea is decidedly steamy. The wound margins sooner or later become swollen, whitish-yellow and exude a purulent discharge. Hypopyon is seen and the anterior chamber soon fills with the exudate. In spite of all treatment the invasion of the cornea and iris continues and most of the former melts away as a part of the destructive process. At last, the vitreous is infected, the wound opens widely and the picture of panophthalmitis is complete.

Finally, the mental balance of old people is especially prone to be disturbed by putting them in a dark room of a strange hospital, to say nothing of the anxiety connected with a serious operation.

The majority of insane patients recover under sedatives and judicious moral suasion. In every case the condition of the bladder, bowels, urine, blood, etc., should receive attention. Care should be exercised to prevent a temporarily insane patient from tearing off the bandages and otherwise injuring his wounded eye.

DISCUSSION

Dr. H. W. Woodruff, Joliet, Illinois: As Dr. Wood has said, this subject is a very extensive one. There are so many points to be taken up and considered that I hardly know which particular one to speak of. The doctor referred to atropin conjunctivitis. I have never seen a case of atropin conjunctivitis in connection with a cataract operation except rather late, after atropin has been used for so long a time it was scarcely necessary to use it longer. My idea of atropin conjunctivitis has always been that it was an acquired condition, and I still hold to this idea; that is, if I was using atropin in a patient's eyes and he should develop atropin conjunctivitis at once after a few drops of atropin, I would think that atropin had been used in his case perhaps many years before. I remember more than one instance in which I used atropin for weeks for an interstitial keratitis that atropin conjunctivitis occurred; and then years after when refracting this case one drop of atropin would bring about this same condition. So I think possibly a condition of that kind may account for atropin conjunctivitis in some cases.

Just one other point, because I have a very pronounced conviction on the subject, having gotten this by actual experience, and I have spoken of it many times before, and that is sub-conjunctival injection treatment of infection following the extraction of a cataract. A number of years ago I lost a case from infection. My attention was called to an article in the *Annals of Ophthalmology* by Bourgeois on treatment following infection after cataract extraction, and he cited six cases in which he had used this treatment with such remarkable results that I took very careful notice of it and the next time I had an infection I used it. I would like to tell you about all of these cases of infection and the results that I obtained with the use of this solution, which is cyanid of mercury. Knapp said not all

cases that looked like infections are really infective cases, but you cannot afford to wait to determine that point always, so this first case I relate possibly might not have been a true infection. This man was operated on by simple extraction. The day after the operation I examined the eye and found some faint signs of exudate in the pupillary area and also in the anterior chamber. With this experience of Bourgeois in mind in the treatment of infection, I went to the drug store and got a solution of cyanid of mercury, 1/1000 and returned to the hospital. At 11 o'clock in the morning I made the injection, subconjunctival, a deep injection, deep in Tenon's capsule. I examined that eye again at 4 o'clock in the afternoon. There was no increase in the amount of this exudate, but I made another injection just the same. The next morning—twenty-four hours after the first injection—there was no evidence of exudate in the anterior chamber.

I have had a number of those cases, and some of them so positively cases of infection that there was no doubt about it.

I will cite another case. This was in a man who had had dacryocystitis, which I treated before venturing on the operation. I operated, of course, with the fear of infection constantly before me. The next morning when I went to see him, he immediately sat up in bed, pulled the bandage off his eye, and said, "Good morning, doctor." I said, Well, if he has not already acute infection he is in line to infect himself. I removed all the bandage and there was a clear case of infection present, an exudate in the anterior chamber and a circle of exudate in the cornea. Here there was no mistake about this, and I injected him in the same manner as the previous case, and that man made an absolutely perfect recovery. There was no cloudiness of the cornea and the result was as perfect as if he was never infected.

Dr. Willis O. Nance, Chicago: Many of the accidents attending operations for cataract can be avoided by giving careful consideration to five or six details. The first important point is sufficient—which usually means efficient—anesthesia. As to the method that can best be obtained operators differ. Dr. Wood prefers cocain and holocain. Personally I almost invariably use the cocain solution, and I find that the amount of cocain and the length of time it should be applied varies considerably in individual patients. Without proper anesthesia no operation for cataract can be successful, and complications are very apt to occur at the time of the operation.

Second to efficient anesthesia is adequate light, especially when performing an iridectomy, and I take it that most of us in performing operations for cataract perform iridectomy. I do almost invariably. I began operating that way and I never felt that I was a sufficiently experienced operator to forsake this method for the simple extraction. Occasionally, however, I do a simple extraction, but it is very seldom. I believe the operation by iridectomy is by far the safest procedure.

Third is the corneal incision. Dr. Wood has mentioned the dangers of a too small corneal incision. Many years ago when I was a student of Dr. Hirschberg, in Berlin, he was demonstrating operations for cataract on living rabbits. He dwelt upon, and preached, and insisted upon a large corneal incision, and I have never forgotten the lesson. I remember well the question came up as to how much of the circumference of the cornea could be included in the incision without danger of necrosis, and his reply was, "You can safely remove three-fifths of the cornea without fear of necrosis." The incision must be made large enough.

Fourth is the matter of the cystotomy. I think it is an excellent idea to test the sharpness of the cystotome every time it is employed. We may find the point slightly blunt in which case the capsule may not be ruptured and we will have difficulty in removing the lens.

Fifth, gentle but firm pressure is required for removing the lens. Repeated stroking of the cornea cannot but do damage to the eye; but firm, and at the same time exceedingly gentle pressure is indicated, and if the incision is sufficiently large and the capsule well ruptured, the lens will come out with very little trouble.

Sixth, care must be taken in the toilet of the wound. The question of light is important at this stage. If we do not have suitable light we may leave shreds of iris in the wound, with the result of which we are all familiar.

Seventh, the question of bandaging. It is exceedingly difficult to apply an eye bandage so it will remain in place and at the same time exert no undue pressure on the eye-ball. Early in my operative work I put bandages on too tightly. I am satisfied in some cases it had a tendency to prevent rapid or uniform union of the corneal wound.

Next comes the question as to when the eye should be examined. Dr. Wood has alluded to the teaching of Smith, which is substantially to the effect that the bandage should be left on ten days without examining the eye. I believe that to be an exceedingly unsafe procedure. I invariably make an examination of the eye within forty-eight hours after the operation.

When infection occurs, which is not very often these days, the best treatment I have employed is that just recommended by Dr. Woodruff, of injection of cyanid of mercury into the orbit. I have seen cases of infection, in which one or two, or possibly three injections of cyanid of mercury into the orbit have unquestionably saved the eyes. Before the adoption of that method those eyes would have been lost.

Dr. George F. Suker, Chicago: Dr. Wood has so thoroughly covered the ground that one can add but incidental facts. The inordinate use of cocain in operations for cataract is to be deprecated as it is very liable to cause a collapse of the cornea, a complication not overly desirable.

I wish to suggest the use of adrenalin two or three times a day, for two or three days prior to the operation in order to determine the presence or absence of ocular vascular sclerosis. If arteriosclerosis is present then do not use the adrenalin at the time of operation as it favors latent hemorrhages and causes an excessively prolonged anemia and induces local wound necrosis.

The size of the incision is an important one. It is far better that the incision be too large than too small. It is crowding the lens through a relatively small corneal section that causes undue injury to the iris and adjacent ciliary bodies and processes.

In regard to the use of the cystotome, I agree with what Dr. Wood has said, but I much prefer the use of the capsule forceps. With them, one can better remove a larger piece of the capsule and thereby insure a smaller percentage of secondary capsular cataracts. It is the shredding of the capsule by the cystotome and the non-delivery of these, during lens delivery, which fall into the filtration angle, obliterating the same and thereby causing glaucomatous conditions. The larger the piece of capsule removed the better.

Dr. C. F. Burkhardt, Effingham: I only wish to ask a question. I have had very little experience with cataract operations, but owing to the fact that cocain is so destructive to the cornea, I would like to ask Dr. Wood what his experience has been with novocain.

Dr. Casey Wood (closing the discussion): We have at St. Luke's Hospital one form of light for the ophthalmic and another for the general surgeon. The latter, who depends mostly upon direct illumination, seems to prefer a double cylinder, each provided with a strong convex lens so directed at an acute angle that a single round sphere of light is directly thrown upon the field of operation. This device furnishes a very brilliant illumination, but it is too strong for eye work, for which a single cylinder and the oblique illumination is preferable. In the latter case there are no uncomfortable reflections from the cornea and the patient does not suffer from too much light. I have never seen uncomfortable heat from this light because it is placed high, say twelve inches from the eye.

I would like to emphasize the importance of making a personal examination of the eye the first day or so after the ordinary cataract operation. I would advise operators against allowing interns or nurses to make these early examinations of the eye, because if not properly done, there is much risk of damage, especially to the partially healed corneal wound.

As to the use of cocain and its evil effects, I tried to emphasize in my paper that there should be only one drop of the solution used at a time, every three minutes for fifteen minutes, five drops in all—never more. What is the use of instilling more than a single drop into the conjunctival sac? If more than one drop be used it does not remain in the sac. The temptation is, of course, to flood the eye with the anesthetic in the hope of increasing the effect.

I have had some experience with novocain and do not like it. I do not think it produces deeper, or better or longer anesthesia than the mixture I have mentioned; also, it is very irritating. I prefer the hydrochlorate of cocain; but, then, I have had very little experience with the nitrate.

THE USE OF A CONJUNCTIVAL FLAP IN PERFORATED WOUNDS OF THE GLOBE (WITH DIAGRAMS ON THE BLACKBOARD)*

GEORGE F. SUKER, M.D.

CHICAGO

(AUTHOR'S ABSTRACT)

One of the most important recent advances in modern ophthalmic surgery has been the promulgation of the conjunctival flap in an endeavor to save eyes which received extensive perforating wounds. Though this work on the conjunctiva received considerable attention at the hands of Schoeller in 1876, yet it fell into desuetude until Kuhnt revived it in 1884, with slight modifications. Therefore, all honor and glory in this regard belongs to Schoeller, but is also shared to an extent by Kuhnt and da Gama Pinto.

This conjunctival flap is made as follows: At the site of injury or in the most immediate area, the conjunctiva is dissected loose a requisite distance beyond the lateral edges of the wound. It is next dissected loose backwards as far as it is deemed necessary—depending on the size of the wound to be covered. You either dissect the conjunctiva half way around the corneal circumference or less. If less, then make a flap by two vertical incisions, one at either end of the limbal cut. The flap is now stretched over the lesion and fixed by sutures into the conjunctiva on the opposite side. Several sutures are necessary, in fact the flap is simply anchored as it were to the conjunctiva on the opposite side. The sutures pass through a fold of the conjunctiva.

In this way either the whole or a portion of the cornea is covered. The sutures are removed within four or five days.

You proceed in a similar manner for scleral wounds. If scleral wounds are so situated that you can obtain a flap on both sides of wound, then you can have one flap overlap the other and thus obtain a very strong support. In such instances you follow more or less the technic of a McReynold's pterygium operation.

By means of this flap, a class of cases involving the cornea and adjacent sclera, which heretofore meant either a permanently irritable

---

* Read at the Sixty-Second Annual Meeting of the Illinois State Medical Society, at Springfield, May, 1912.

eye or an enucleation, are no longer sacrificed. Furthermore, a class of cases entailing either a total or partial loss of corneal substance, because of injury or disease, which heretofore necessitated enucleation or one of its substitutes, need not any longer be thus sacrified; the same is true of extensive wounds of the sclera. The prolapsed portions in either case are amputated before covering the wound with this flap. Necessarily this mode of saving a globe is not available when the foreign body cannot be removed or extensive infection of the interior wound has already taken place.

Staphyloma, either scleral or corneal, are in particular unsatisfactory cases to treat; first, because of their progressive nature; secondly, because our surgery heretofore was inadequate either to correct or stay the condition. These need no longer give us great concern, because this conjunctival flap offers an efficient and permanent remedy; the staphyloma is nearly removed in toto and the heavy conjunctival flap brought over and fixed.

It is needless to remark that perforative corneal conditions, from whatever cause, have been and always will be a subject of the greatest solicitude to the ophthalmic surgeon. One need only read the disastrous results which follow these perforations—iris prolapse, if nothing more—what difficulties one has to overcome in this class of cases in order to get "support" and promote union. How often, in spite of our resourceful efforts, are staphylomatous conditions but the end-results of our endeavors.

Corneal fistulæ, which at times prove very obstinate, yield readily to this conjunctival flap.

This conjunctival flap is particularly applicable in dealing with scleral wounds. Norman Hanson very tersely states two axioms for this flap, when one deals with extensive wounds of the sclera: 1. It is a protection against infection. 2. It furnishes the only means by which uniform pressure is secured, thereby insuring the exact juxtaposition of the sclera, retina and chorioid. This latter is not achieved when scleral sutures are resorted to, inasmuch as they necessarily cause by their insertion a separation between chorioid and sclera. When large areas of scleral tissue are sacrificed it is not advisable to attempt to suture the wound with catgut and then put the conjunctival flap on top of this; but it is better to depend on the latter alone, which, under these circumstances, must be rather large and thick. Furthermore, any prolapse of vitreous or uveal tract must be previously amputated.

The ever-advancing and sloughing corneal ulcer, whether of the serpiginous type or not, offers a large field for the application of this flap. If the base of the ulcer be curetted, the edges vivified and a flap brought over, being well pressed into the ulcerated areas, results well nigh marvelous, are the recompense. Should the cornea perforate in these cases, it is an impossibility for the iris to prolapse as the anterior chamber is immediately restored. The iris, if prolapsed, is excised and freed from its attachments to the edges of the perforating wound. The progress of the ulcer is effectually checked and many times economic vision restored, upon later resorting to an optical iridectomy.

This flap is especially of great service in such cases, where from intraocular inflammations of the non-malignant type, or from conditions akin to gonorrheal ophthalmitis, large perforations of the cornea take place and the eye is in danger of being lost because of the various prolapses of its contents. In such cases, the eye must be carefully manipulated and the flap so placed that drainage is not altogether thwarted. If in these conditions, the anterior chamber be filled with Haab's iodoform rods or simple iodoform powder, you will be surprised at the satisfactory results. It is advisable before inserting the powder or rods to have the flap *in situ*, but not firmly fixed.

Goldzieher and Kuhnt have even used this flap for the protection of the cornea in gonorrheal ophthalmia after perforation has taken place and to prevent the extensive ingress of intraocular infection. They cover the whole cornea by means of two flaps, one from each side, which overlap and are fixed at the ends. This suggestion is particularly indicated when the cornea is threatened with annular serpiginous ulcers which are prone to perforate — I myself have employed this flap in several cases of this kind.

This conjunctival flap may at times be of service in combating extensive central corneal conicities. Instead of cauterizing according to the Elschnig method, the apex is excised and the flap brought over. This is advised only for aggravated cases. Much more support is offered to the cornea in this manner than by any other method and the resultant acuity of vision is at least equivalent if not greater. An optical iridectomy is in most instances obligatory after any measure intended to overcome the conicity or staphyloma. If this flap is not too broad or thick and has been properly placed, the optical iridectomy need not be any larger than for the other conditions demanding such an iridectomy.

The length of time consumed before the transplanted conjunctival flap becomes uniformly cicatrized varies under circumstances from about four weeks to six months. This, no doubt, depends largely on the vascularization which at times is quite marked. If too much time is consumed for this purpose, then the part projecting beyond the implicated corneal area and extending to the conjunctival base may be removed. This can be done after the manner of removing a pterygium. The flap is, in fact, nothing else than an artificial pterygium. On the other hand, the adherent flap can easily be tattooed.

In using the flap especial care must be exercised that sufficient allowance is made for its shrinkage; and, in every instance, the flap must be well fitted into the part which it is to cover. If the parts are thoroughly cleansed and freed from any blood or serum, both the corneal area and the under-surface of the flap, primary adhesion is quite intense and rapid. At times, a stay suture (depending on varying circumstances) may be necessary. This is then passed through the base of the flap and fixed at a point in the conjunctiva directly opposite. It may be removed within thirty-six to forty-eight hours, that being ample time for union to have taken place.

This, in brief, gives an adequate idea of the extensiveness of the applicability of the conjunctival flap. That it is not a panacea for all the conditions mentioned, goes without saying, neither is it in any sense a *sine qua non*.

Rarely, if ever, does this flap slough or ulcerate. If it does, then the causative conditions underlying it are general rather than local. For, as far as local conditions; such as infecting bacteria, tension in flap, undue pressure, etc., are concerned, they can be controlled. Again, it is advisable to have at least one or two blood-vessels coursing uninterruptedly to the very apex of the flap. With the blood-supply assured, and the flap of requisite size, the untoward results are greatly minimized.

If the flap properly overlaps the involved area, and if the edges of the flap are not allowed to roll up on themselves, particularly so on the under surface, the operation will not be a failure. So also does the thickness of the flap play an important rôle; this depends largely on circumstances and conditions to be achieved. Usually, a flap that is thin at its apex and gradually increasing in thickness toward the base, is the desirable one. Then, too, the under-surface of the flap must be free from hemorrhages or clots and the part to which it is applied must likewise be in a similar condition. In other words, the exact principles one follows for skin-grafting are to be observed. The flap must at all times be fairly well stretched to avoid any puckering or rolling up of the edges, and the eye must be so firmly bandaged as to insure practical immobility.

From the foregoing one can readily see that certain precautions are to be observed in employing Kuhnt's conjunctival flap. Yet, no one surgical intervention on the cornea or conjunctiva has such a large field of usefulness as this flap when properly made, in the class of cases for which it is indicated.

To briefly summarize, this flap is applicable in:

1. Extensive wounds of the cornea and sclera with or without loss of substance in either, or prolapse of ocular contents.
2. Corneal fistulæ.
3. Serpiginous or perforating corneal ulcers.
4. Corneal or scleral staphyloma.
5. Prolapses of ocular contents.
6. Hernia of the iris.
7. Extensive conical cornea.
8. Untoward conditions in wounds following cataract extraction and the like.
9. As a protection for the cornea in conditions similar to gonorrheal ophthalmia, in which extensive perforations and resulting intraocular infections are liable.

DISCUSSION

Dr. Willis O. Nance, Chicago: As Dr. Suker has stated, there is no new principle involved in this procedure. Personally I have employed it for the last five years and invariably use this method in the management of peripheral perforating injuries of the cornea. I, however, never cover the entire cornea with a conjunctival flap. I never have treated central ulcers of the cornea or ulcers in that vicinity by this method, preserving it for those at the limbus or near the limbus.

I fancy it would be exceedingly difficult to loosen up a sufficient amount of conjunctiva to cover the entire cornea especially if one depended upon drawing it over from one side.

The principle of the operation is absolutely correct and it works out beautifully in practice. It is by far the best procedure with which I am familiar in the management of peripheral corneal perforating wounds, and I invariably employ it. As to the question of employing it in cases of gonorrheal conjunctivitis I would not be inclined to do it. I would not consider it a good surgical procedure to cover the entire cornea with conjunctiva or anything else that would prevent an unobstructed view of that tissue. Of course a cornea that is perforated does not by any means necessarily mean the loss of the eye. We all have seen numerous cases of corneal perforations where the eye recovered with very good vision and I certainly would hesitate before covering the whole cornea or a large part of it in cases of infection by gonococci.

Dr. Richard J. Tivnen, Chicago: Relative to the point Dr. Nance made about the difficulty of drawing the conjunctiva over from this point to this (indicating on blackboard) and suturing it, I had a case some years ago of rupture of the sclera about this point. I dissected the conjunctiva around the entire circumference of the cornea and made a pursestring suture. In that case I had no difficulty.

In regard to Dr. Suker's suggestion of covering over an ulcer complicating a gonorrheal infection, I must say I agree with Dr. Nance, I would be fearful of covering the site of such an ulcer in this manner.

Dr. H. W. Woodruff, Joliet: While I have had some experience in using the conjunctival flap for the cornea, I have also had clinical experience that shows that the doctor's reasoning is after all sound; perhaps others may have had the same experience in gonorrheal conjunctivitis in the adult. I recall distinctly a case in which the only part of the cornea which remained clear following the inflammation was a part above which was covered by the swollen conjunctiva and when the eye recovered I had no clear cornea except this part which had been protected by the conjunctiva.

Another thing occurred to me while Dr. Suker was explaining his operation and that was I would like to have him say something as to whether he thinks the idea is feasible in cases of symblepharon in which the operation of skin grafting is necessary. To protect the cornea from the plate by these conjunctival flaps. Of course, you could not do it at the site of the symblepharon, but supposing the symblepharon involved the lower portion and the rest was free, would it be possible to do that?

Dr. Suker (closing the discussion): In reference to the question of symblepharon, there is no objection to anchoring the conjunctiva from above or below as suggested by Dr. Woodruff. You can leave the conjunctiva fixed a week or ten days and if one suture tears, replace that suture and then at the time you think justified, remove the sutures and the conjunctiva will retract voluntarily. The next case of symblepharon I have, I certainly will try this suggestion. The idea is a very good one.

THE SIGNIFICANCE OF ARTERIOSCLEROSIS IN THE FUNDUS OCULI*

EMORY HILL, A.B., M.D.
CHICAGO

One need scarcely apologize for presenting the subject of arteriosclerosis before any medical body. A pathologic condition whose etiology is accredited to syphilis, typhoid fever, nephritis, malaria, diabetes, gout, lead poisoning, alcoholism, nicotin poisoning, overeating, intestinal auto-

* Read before the South Side Branch, Chicago Medical Society, March 26, 1912.

intoxication, cardiac disease, and the whole system of wrong living popularly described as the "strenuous life" (without exhausting the list) cannot fail to be of interest to every physician; nor can we regard recent evidence of the Egyptian mummies as a relief from the problem.

Again, the early evidence of a beginning degeneration of the arterial system, with its prophecy of general physical and mental decay, is essential to preventive therapeutics. The layman can recognize an advanced arteriosclerosis when permanent injury has been suffered by brain, heart, or kidneys; but the symptom-complex of beginning arteriosclerosis is more elusive and more important. Modern life involves for many of the population long working hours indoors, a minimum of exercise in pure air, an environment of hurry, noise, and anxiety in regard to financial success, disturbed sleep, unwholesome food; in short, unceasing demand on the human organism for more labor, whether it be called work or play, than it can safely perform. The threadbare maxim that a man is as old as his arteries comes to the attention of the physician daily when he sees prematurely old men and women keeping up with difficulty the pace which was formerly easy. The hopeful phase of this situation is the possibility of recognizing the disease early and regulating the patient's habits so that the progress of the arterial degeneration may be checked and life and efficiency be prolonged in comfort.

It is the ophthalmologist's fortune to be able to study the circulation in the retina as it can be studied nowhere else in the entire organism. The blood-vessels lie before his eye with nearly or quite transparent media intervening. The retinal arteries are end-arteries, peculiarly susceptible to the influences of hypertension and of circulating toxins with the consequent degenerative processes in the vessel walls. Their proximity to the cranial cavity enables the observer to estimate with a degree of accuracy the status of the circulation in the brain, where the effects of arteriosclerosis are necessarily of greatest import. We know that arteriosclerosis is at first a more or less localized condition, and at any stage of the disease some localities exhibit more advanced sclerosis than others. The retinal vessels, more often than not, are the seat of early and extensive sclerotic changes, and their appearance may be pathognomonic when the stethoscope, the palpating finger, and the sphygmomanometer do not elicit the classic symptoms of the disease. Therefore the general practitioner may be interested in the problem of arteriosclerosis from the standpoint of the ophthalmologist, who often has the first opportunity to discover the disease.

The individual who wears glasses for the correction of an error of refraction, and who consults the ophthalmologist periodically for a change of lenses, probably learns of suggestive signs of arteriosclerosis in the retinal vessels and is referred to his family physician for general treatment before the latter has occasion to look for such disease. A larger group of patients are those who have overcome a greater or slighter ocular defect in youth, but who with advancing age can no longer maintain this strain with comfort. Disappointed with their own, or an optician's, correction for presbyopia, they seek the ophthalmologist's aid. They

complain of blurred sight, diminished vision, undue sensitiveness to light, itching or burning of the lids, eye pain, headache, or many vague symptoms of nervous strain, all due to errors of refraction; or perhaps they merely want lenses which will enable them to read a book or thread a needle at close range, instead of holding objects at arm's length as uncorrected presbyopia necessitates. A very practical consideration is that the man or woman at 40 or 45 years of age is brought to the ophthalmologist for one or more of a great variety of complaints, arising or growing intolerable at this time of life when arteriosclerotic processes first show themselves and when rational hygienic and medical advice is of inestimable value to the patient.

On inspecting these eyes, one observes occasionally the arcus senilis, a gray ring in the cornea, near its periphery and concentric with it. This is a degeneration of the corneal tissue, occurring with age, but too variable in its onset to be of diagnostic importance. With oblique illumination one is impressed by the general cloudiness of the crystalline lens, or its differentiation into sectors. This is a sclerotic change, an exaggeration of the firmness which the lens ordinarily begins to exhibit in middle life, and on the other hand a mild degree of that loss of transparency which we designate as cataract, though happily the degree of opacification denoted by the term "cataract" never develops in the majority of these cases. With the ophthalmoscope one sees the retinal arteries and veins branching throughout the retina from the optic disk as a center at which the arteries are given off from the central artery of the retina, a branch of the ophthalmic division of the internal carotid, and the veins empty into the central vein of the retina which is tributary to the ophthalmic vein. Normally the retinal vessels are translucent, of uniform caliber, and reveal no pulsation. One frequent exception is noted, however, in the pulsation of one or more branches of the central vein where it enters the nerve. With the hyperemia attendant on eye strain such a venous pulsation is by no means unusual. Arterial pulsation may be produced by pressure on the globe, but otherwise is a pathologic appearance. With the loss of elasticity in the arterioles and the development of connective tissue chiefly in the inner coat of the artery walls, which is the essential feature in the pathology of arteriosclerosis, in the minute retinal vessels, certain logical alterations in the normal fundus picture occur. These alterations have been described by many writers, and most completely in America by de Schweinitz[1] of Philadelphia, from whose writings I quote freely.

The central light streak on the arteries becomes more distinct, and the entire breadth of the arteries is of an unusually light color. The translucency of the arteries is lost, so that one no longer sees an underlying vein beneath an artery. White stripes appear along the course of arteries, indicating degeneration of the walls and infiltration of the perivascular lymph-sheaths. Instead of a fairly straight course, the vessels exhibit tortuosities, especially the fine arterial twigs far to the periphery

1. Text-Book on Diseases of the Eye, and quoted in Duane's Translation of Fuch's Ophthalmology.

of the fundus, which are often cork-screw shaped. One must remember, however, that sinuous vessels are frequent congenital peculiarities, and by no means rare in exaggerated cases of retinal hyperemia which accompanies errors of refraction; and, therefore, are of pathologic significance only in conjunction with other appearances of arteriosclerosis. Ordinarily hypertension accompanies sclerotic changes and we find the optic disk of a dull red color, the veins on the disk pulsating strongly and somewhat engorged throughout the fundus. Such may be regarded as a picture of early arteriosclerosis.

With further progress of the sclerosis, we find greater tortuosity and irregularity in the caliber of the vessels. The arteries may pulsate, and they present a beaded appearance, being obliterated in places and finally may be converted into white threads, "silver-wire arteries." The veins, too, present irregular dilatations and contractions, and are flattened out where crossed by arteries. Peripherally to the crossing the venous stasis results in bulging of the veins which may give an ampulliform enlargement, while for a short distance centrally to the crossings the veins are partly or completely obliterated. Sclerotic changes occur in the vein walls as in the arteries. With the mechanical obstruction to the outflow of the retinal circulation, we observe unevenness of the surface and grayish coloration indicative of edema of the retina. Obviously increased blood-pressure in highly sclerotic arteries will cause hemorrhages, which appear as flame-shaped, striate, or irregular red masses anywhere in the fundus and, absorbing, leave pigment deposits about white areas of retinal and chorioidal atrophy.

Needless to say, such profound circulatory disturbance involves the nutrition of the retina and causes impairment of vision, varying from the cases of nearly or quite normal sight for a few moments followed quickly by a sense of dimness due to tire, which is but part of the general exhaustion of the too easily tired victim of arteriosclerosis, to the cases of more or less complete blindness from extensive hemorrhages throughout the fundus, especially when they encroach on the macula. Hemorrhages into the eye at times raise the ocular tension producing glaucoma, which is distressing on account of the severe pain it occasions as well as the destruction of sight. Therefore, we must regard arteriosclerosis of the retinal vessels as of the very gravest significance in respect to vision.

Moreover, hypertension and sclerosis augment the danger attendant on surgical procedures on the eye. To the possibility of expulsive hemorrhage with its usually disastrous outcome after eye operations is to be added the slow and imperfect healing in persons with the defective nutrition which accompanies such vascular changes. The knowledge gained by the fundus examination in an eye with incipient cataract may deter the surgeon from attempting what would be an unfortunate operation for the removal of a more mature cataract in the fellow eye. Several months of judicious treatment of the hypertension has been followed in such cases by a smooth operation with good visual result, and moreover has in all likelihood forestalled cerebral hemorrhage. It seems not unreason-

able to suppose that such knowledge of the vascular condition may be of value to the surgeon contemplating operations on other parts of the body.

The significance of ocular findings with reference to the general health has been a matter of interest to ophthalmologists since the invention of the ophthalmoscope in 1851. In 1869 Berthold[2] wrote on retinal hemorrhage as foreboding cerebral hemorrhage. Bull[3] discussed the same subject in 1874; and in 1889 Raehlmann[4] wrote exhaustively on the subject of retinal disease in relation to general arteriosclerosis. Yet so slow was the reception accorded this diagnostic method, that as late as 1890, Gowers,[5] an exceedingly careful observer with a vast experience, said "Chronic changes in the vessels rarely reveal themselves by retinal signs." More recently, however, much has been written on the subject, and postmortem findings have given positive information, especially in respect to the associated vascular disease of the retina and the brain, of whose nervous tissue the retina is to be regarded as an expansion. Geis[6] has recently reported the results of his study of 250 cases from Uhthoff's clinic in Breslau. He learned that, with arteriosclerosis of the retinal vessels microscopically proved, there is always a similar condition of the basilar brain vessels, and often localized softening of the brain tissue as well. On the contrary, he sometimes found an arteriosclerosis in the basilar vessels when there was less, or no, change in the retinal vessels. So we may infer that the process in the brain vessels is equally advanced or more extensive than the visible changes in the retina. Of seventeen cases of advanced retinal arteriosclerosis all died of apoplexy, generally within four years. Of thirty-two cases of retinal hemorrhage, with high blood-pressure and arteriosclerosis, all had apoplexy. This series emphasizes the truth of Derby's[7] views of the seriousness of retinal hemorrhage, based on a series of thirty-one cases of which twenty-five died within a short time. In seventeen cases of embolism of the central artery of the retina, Geis[8] found no other cause except arteriosclerosis; fourteen of these cases died of apoplexy. In contrast to these seventeen cases, he found only six cases of embolism due to heart disease. He quotes Harms' statement that embolism is very rare in the normal artery even when heart or kidney lesions exist; but that generally the vessel shows endarteritis obliterans or thrombosis. Galinowsky[8] has made a most thorough microscopic study of a case presenting the appearance of embolism, really due to an endarteritis, and his views are supported by quotations from such recognized authorities as Priestley-Smith, Haab, and von Michel. Bull[9] believed that cases of atrophy of the optic nerve and central scotoma, accompanying retinal arteriosclerosis, and sometimes diagnosed as simple

2. Ein Fall von Haemorrhagia retinae als Vorbote, etc., Berl. klin. Wchnschr., 1869.
3. Retinal Hemorrhage and Its Connection with Cerebral, Cardiac and Renal Lesions, Am. Jour. Med. Sci., 1874.
4. Ueber Sichtbare Erkrankungen der Netzhaut bei Allgemeine Arteriosclerosen, etc., Ztsch. f. klin. Med., 1889.
5. Medical Ophthalmoscopy, third edition, 1890, page 235.
6. Beziehungen der Gefässerkrankungen der Netzhaut zu denen des Gehirns, Klin. Monatsbl. f. Augenh., January, 1911.
7. Retinal Hemorrhage and the Duration of Life, Tr. Mass. Med. So., 1897.
8. Ueber Endarteritis der arteria centralis retinae mit Concrementbildung, Archiv. f. Augenh., 1901, voll xliii.
9. Arteriosclerosis and Its Bearing on Certain Lesions of the Retina and Optic Nerve, Ann. Ophth., January, 1904.

glaucoma, were due to sclerosis of the internal carotid, ophthalmic, and anterior cerebral vessels; and he found corroboration in Liebrecht's[10] studies.

Such a résumé convinces one of the truly alarming significance of advanced arteriosclerosis in the retinal vessels, not only in respect to vision but to life as well, since these vessels are an index to the vascular integrity of the brain. To this must be added the numerous retinal diseases in which the sclerotic vessels are but one part, and perhaps a small part, of the complications of a systemic disorder; for example, the well-known albuminuric retinitis of advanced Bright's disease. In these serious constitutional disturbances, where the fundus picture is a valuable aid to diagnosis, it too often signifies a most unfavorable prognosis. The important service of the ophthalmologist is in the early stages of arteriosclerosis when the damage already done is slight.

As noted already, we usually discover these early changes in the course of routine examinations for the estimation of errors of refraction; and the frequency of our discoveries is directly proportional to the thoroughness of our routine fundus studies. This fact leads me to say that the attempt to refract middle-aged people without cycloplegia is an injustice to the physician himself and a gross injustice to the patient. Even if the thorough correction of errors of refraction were possible without cycloplegia (a supposition which is false in an overwhelming majority of cases) still the dismissal of a patient without a knowledge of his fundus, gained by study through the dilated pupil, is a careless procedure, to put it mildly. Of course, care is requisite to avoid increasing intraocular tension and precipitating glaucoma by the use of cycloplegics in old people, and even in middle-aged people; but the physician who cannot use such judgment is not an ophthalmologist.

Supplementing the vague complaints of many minor points and aches, digestive disorders, shortness of breath, mental hebetude, inordinate tire from the day's work, etc., by a careful study of the eyes under cycloplegia, we can accomplish several distinctly important results. We can correct the errors of refraction so that distant vision may be not only as acute as the eyes will allow in the given case, but will be easily and restfully secured. We can add to this correction for distance the convex lens which give a comfortable range of near vision, for the particular kind of close work which the patient has to do. The victim of arteriosclerosis cannot overwork delicate eye muscles hour after hour without discomfort; nor is he to be expected to accomplish with imperfect eyes what grosser muscles refuse to do after much less strain has been put on them. To make the eyes as nearly perfect optical instruments as possible by the use of proper lenses worn constantly is the first requisite. To instruct the patient in regard to his habits of eye work, the extent of reading, writing, and sewing, which can safely be done, the print and light which are suitable, etc., is to add vastly to the comfort of the patient. Of even more importance is our advice that he see his family physician, and be given the

10. Schnerv und Arteriosclerose, Archiv. f. Augenh., 1901-2, vol. xliv.

benefit of a thorough physical examination with a study of the chemistry of his secretions.

The recent character of these cases and the vagueness of their symptoms make them far from easy to treat. But their importance makes it imperative that they be not neglected. They often do not appreciate our advice nor regulate their habits accordingly. The average patient trusts more to the supposedly miraculous powers of a bitter concoction than to the pursuit of a rational hygienic plan. Yet the average physician is scarcely the one to cast the first stone! The problem of the overworked and overworried middle-aged man and woman is a large one; and the satisfaction is also large when we can put them in the way of health and efficiency and prolong their working years, through the combined advice of ophthalmologist and family physician, with the modicum of drugs which may serve as adjuvants to wholesome living.

22 East Washington Street.

PREVENTION OF BLINDNESS AND CONSERVATION OF VISION*

THOMAS A. WOODRUFF, M.D.
CHICAGO

Preventable blindness is due to numerous and varied causes, among them being industrial accidents; accidents at play; Fourth-of-July celebrations; sequelæ of some of the infectious diseases; wood alcohol; sympathetic inflammation; progressive near-sightedness; eye-strain of various kinds, particularly among school children, and ophthalmia neonatorum.

The question is asked—what are the forms of preventable blindness, and what can be done to protect those who are in danger of being overcome by such a calamity? Broadly speaking, they may be divided into those occurring as the result of accident and those from disease.

Blindness as the result of accident cannot always be avoided, although if their danger were known the large majority could be averted.

Accidents occur among children playing with sharp-pointed instruments, such as knives, sharp-pointed sticks, scissors, etc., the handling of fire-arms, fire-works and fire-crackers, etc., by those who are inexperienced in their use, all causing injuries to the eyes, which, if careful preventive measures had been taken, could easily have been avoided. Accidents occurring in the various trades and industries are responsible for numerous cases of partial or complete blindness of one or both eyes. Such injuries are produced from blunt objects injuring the eye-ball, from flying particles of steel and other foreign substances either penetrating the eye-ball or becoming lodged on the cornea, the latter producing numerous scars, sometimes so numerous as to dull the cornea and dim the vision. These can be prevented by various known means, such as the adjustable shield devices placed on grinding wheels, circular saws, lathes and many forms of rapidly revolving machinery, helping to prevent

---

* Read at the Sixty-Second Annual Meeting of the Illinois State Medical Society, at Springfield, May, 1912.

particles flying in the workman's face. Large protective glasses and glass protectors surrounded by wire gauze are serviceable in protecting the workman's eyes from flying particles. Wire gauze masks are useful protection against sparks and flashes from molten metal. The bursting of gauges on steam boilers frequently injure the eye by flying pieces of glass or scalding by the steam or hot water. These may be protected by wire netting or plate glass protectors. Colored glasses of amber or blue should be worn by those who work as metal polishers and buffers, and men watching furnaces where there is excessive heat and light from the fires and molten metal. Helmets and screens with four or six layers of red and green glass are often used by those working where there are strong light flashes before the eyes, as in short circuits and electric welding.

It is important that an injured eye should receive aid promptly and from one who is skilled in the handling of such cases. It is not infrequent that wounds of the cornea resulting from foreign bodies becoming imbedded, are infected as a result of their removal by the use of a dirty handkerchief, or cloths and unclean instruments in the hands of a fellow workman who is ignorant of the necessity of cleanliness and the danger of infection. Fortunately, many of the foreign bodies are frequently sterilized by heat before entering the eye, but even then infection is liable to occur from dirty hands, etc., of the one who undertakes the service, with no precautions taken to cleanse the injured part by the use of antiseptic solutions. At least 5 per cent. of the blindness in this country is due to ocular injuries and is becoming more frequent with the increase of mechanical appliances and the more general use of chemicals, gases, etc., thus not only lessening the earning ability of a considerable portion of our industrial workers, but rendering a certain proportion incapable of earning anything and becoming a charge on the family or community. The prevention of blindness from industrial accidents is of interest to the general public, not only from a humanitarian standpoint, but from an economic one as well. Partial or total reduction of vision lessens efficiency and therefore makes many victims a charge on society. The laity should be educated as to the seriousness of even slight injuries when infected, which may cause loss of eye-sight or eye-ball.

Among others who have adopted plans for the protection and compensation of their employees, may be mentioned the United States Steel Corporation and the International Harvester Company, who have provided various devices and appliances to prevent accidents and protect the eyes. Not only is it important to compel the employer to provide proper safety appliances, danger signals and rules for the protection of the employees, but there should be laws enforcing the latter to make use of such protective appliances provided. He should be educated to the danger of the neglect of these precautions.

Trachoma is a disease that was imported into this country by immigrants from Europe. It is epidemic in many localities. About 60 per cent. of all blindness in Europe is due to trachoma. When it once gets a foothold in a community it is difficult to control, being easily transmitted, and is a source of danger to all who come in close contact with it. If

treated early, good sight can almost always be preserved, but the course of treatment is necessarily long and tedious and it is not always easy to keep the patient under control; occurring as it does amongst the poorer classes, they are financially unable to devote the time necessary to receive a prolonged course of treatment and thus neglected exacerbations occur which ultimately leave the cornea scarred, and by the time the disease has worn itself out vision is seriously impaired or entirely lost.

A person afflicted with trachoma is not on a par of productive capacity with a healthy individual. That trachoma is present in certain schools in Chicago is beyond question. Nine per cent. of the pupils admitted to the Illinois School at Jacksonville are blind from trachoma. Trachoma should be made a reportable disease, as it is in Philadelphia. "The problem of the trachoma child is a serious one." Debarred from school he is in danger of losing all chance of an education during the only years in which an education is possible. According to Dr. White, trachoma expert for the Department of the Interior, about 80 per cent. of the Indians have trachoma. It is very prevalent in the mountainous districts of Kentucky, in Arkansas and in the southern portion of this state.

Ophthalmia neonatorum stands out conspicuously as the cause of about 25 per cent. of cases of preventable blindness. The evils of this disease are being rapidly controlled by the organized effort that is being put forth in various sections of the country through the combined efforts of the medical profession, sanitary authorities and the public. The medical profession have known for years the microorganism that is responsible for the great majority of all these cases and that as a prophylactic one of the silver salts correctly used would prove effective in curing all but a very small proportion of these infections, but it was not until the public were taken into our confidence and made to know and understand just what this disease is and what could be done to avoid it that results were obtained.

The cost of its prevention amounts to an infinitessimal sum. A 1 per cent. solution of nitrate of silver instilled into the eyes is a sure preventive, two cents worth of which may save the sight of a citizen, and save to the state $10,000 for his support.

We lack in the state of Illinois laws that require:

1. That all births should be reported within forty-eight hours.

2. All cases of inflamed eyes occurring in the first two weeks after birth should be reported within twenty-four hours.

3. The regulations of midwives and midwives' schools. Of the 60,000 births reported in Chicago, 20,000 were attended by midwives.

4. Compelling the use of a prophylactic at birth by physicians as well as midwives.

5. The distribution of a chosen prophylactic with explicit directions for its use.

6. Education as to the dangers of inflamed eyes, methods of infection and precaution.

In the last report of the Massachusett's Commission for the Blind this statement is made: "The enforcement of the reporting law is the

least important part of the Boston Board of Health's preventive work. Every reported case of ophthalmia neonatorium is immediately followed up by a competent nurse, who sees to it that proper treatment is given the child, who, if necessary, is sent to a hospital. Since the institution of this follow-up system in Boston not a single known case of the disease has resulted in blindness.

The conservation of the eye-sight of children is a matter of vast importance. The foundation of subsequent eye disease is frequently laid in our schools. Defective vision and eye-strain are the causes of many physical maladies, which not only render the child dull and mentally incapable of obtaining an education, but ultimately handicap him in future life. The future of a community depends on its men and women. Therefore everything should be done to conserve the eye-sight of its boys and girls. The constitution of the child may suffer if subjected to abnormal conditions during the early period of his development and any visual defects are a menace to the future welfare of these small people. In a work so important it is the duty of the school, the home and the state to act together. If any of these fail to carry out its part in the work the boys and girls undoubtedly suffer. Parents are anxious that their children should be healthy and vigorous, but very often they are ignorant in the knowledge essential to promoting this wish. A dull sickly child is a heartbreak to its teacher as well as parent, both of whom are frequently unable, through lack of special training, to locate the child's physical limitations. The state is ready to do its utmost for its future citizens, but stands helpless because there are no ways and means of carrying out its good intentions. In the meantime the children bear the burden, and because nothing is done in their behalf, go through life needlessly and heavily handicapped. Few realize that such abnormal conditions are serious in the extreme, result in dullness, headache, stupidity and other nervous disorders that go to affect the health of our future citizens. Bodily vigor is impossible; if the child survives at all he is but a miserable second-best of what he ought to be. The pity of it is that these conditions go unremedied when a little timely skill and attention would accomplish so much for the sufferers throughout life.

About 40 per cent. of children of school age have ocular defects which render them incapable of properly performing the functions required to obtain an education. The progress that such children make in school is slow and they rapidly fall behind in their work, remaining stationary in school year after year. Much money is spent annually on the education of these delinquents, much of which could be saved to the state if these ocular defects were detected and relieved before permanent damage has been established. The detection of these defects in early childhood and their correction would have saved many a one from blindness and subsequent misery.

The systematic examination of the eyes of all school children at the beginning of each school year should be compulsory and recognized as a necessary adjunct to the school curriculum. Parents should be notified when such defects exist and advised to have them corrected at once.

Examinations of this sort can be made by the school nurses, school doctor or teachers, but preferably the latter, especially if the system as proposed by Dr. Frank Allport is followed, which is simple and inexpensive and will disclose the existence of 95 per cent. of serious eye defects. The teacher should be trained to detect defects in sight. There is no doubt in the minds of physicians that teachers can readily and efficiently be trained for this work. They are intimately acquainted with the children and are familiar with their physical conditions. The teacher it must be remembered, is not expected to do anything of a remedial character in such cases beyond discovering the child's disability and informing the parent by means of a prescribed form, of the child's abnormal condition. The school doctors and school nurses will follow up this part of the work. If the teacher be made a part of the system whose object is the preservation and conservation of vision, a great stride will be taken toward the welfare of the rising generation.

From an economic standpoint the cost of blindness is enormous. It costs the state of Illinois in the neighborhood of $300 annually to educate a blind child, while the education of a seeing child in the public schools of Chicago costs $34 annually. Ten years is the average period of school life. The blind child oftener stays fifteen. The actual excess paid out for the education of a blind child would not be less than $3,000. From such an estimate we can safely say that other conditions being equal when the individual lives out the normal period, there is an economic loss of not less than $10,000. The yearly expenditure for maintaining the blind in this country amounts approximately to $15,000,000. Of this amount, about $1,800 is expended on the care of those blind from ophthalmia neonatorum. The cost of blindness to the blind is evidenced in that individual being handicapped at every turn from infancy to old age, in activity, pleasure, study, opportunity, freedom. The blind person is handicapped by extra cost for special implements, appliances, special readers and guides. He must expend more energy and nervous force in every endeavor. He must select his work from the very limited number of occupations open to him and enter the contest of life under conditions of unequal competition. The average wage for those of the blind men who are employed is $7 per week; that of the women about $3.

Unnecessary blindness imposed in infancy is an injustice to the child. Unnecessary blindness robs the state of the most valuable asset — a productive citizen.

Dr. Woodruff presented the following resolution to the Eye, Ear, Nose and Throat Section of the Illinois State Medical Society:

WHEREAS, Organized movements are now being conducted throughout the different states for the conservation of vision and the prevention of blindness, and

WHEREAS, Such measures can be successfully carried out only in conjunction with the general public, and

WHEREAS, The benefits arising from such efforts when rightly designed and properly conducted are great, not only from a humanitarian but as well from an economic viewpoint,

***Resolved*, That the Section of Eye, Ear, Nose and Throat of the Illinois Medical Society endorse the work on the Conservation of Vision and the Prevention of**

Blindness being carried on by the American Association for the Conservation of Vision, and approve the appointment of a committee which will be charged with the duty of organizing and conducting such a movement in the State of Illinois. This committee to include sanitarians and other physicians, ophthalmologists, architects, illuminating engineers, teachers and others who may be interested. The work to be coordinated with that of the American Association for the Conservation of Vision.

DISCUSSION

Dr. George F. Suker: I move the adoption of the resolution as suggested by Dr. Woodruff that this section of the Illinois State Medical Society introduce them, and in addition allow Dr. Woodruff to carry out the plan suggested by the National Society.

Motion seconded and carried.

The Chairman: I am sure the section would be glad to have an expression of opinion from men in the various parts of the State on this matter. It is not a Chicago idea by any means. It is a matter we all ought to be very much interested in, and in order to make it a success this society must have the cooperation not only of the medical men but the laity as well.

We all know and fully appreciate in this particular matter Dr. Woodruff has brought before us that an ounce of prevention is worth many, many pounds of cure. He has in one instance called attention to the fact that one or two ounces of silver would save a cost to the state of approximately ten thousand dollars, and there are other matters that ought to be brought more forcibly to the attention of the public. It seems to me it is up to the members of this section, the eye men particularly, to take it upon themselves to spread such knowledge through the territory in which they practice. The movement of the Legislature for the prevention of blindness is also a good one. We can do a great deal of good by proper legislation, in asking the cooperation of factories and foundries and all sorts of manufacturing establishments.

We would be very glad to hear from any of the gentlemen on the subject who care to discuss the matter.

Dr. Frederick A. Guthrie, LaSalle: I find in the city where I live that this is mostly done by midwives and I wish to know whether midwives are ever instructed in that line or not. I believe in Illinois they ought to know about these things or not practice. I think it would be a good thing if the medical men of the state would educate them along that line. I think there is another thing that would be good, and that is a liability law. It makes all the employers liable for injuries to their men and to see that they get the best attention, and also provide protection for the eyes of those who work for them. I think that law would have some effect on the prevention of blindness. Of course, how these things are going to be brought about by educating midwives, is a question that has to be determined.

The Chairman: I would also call your attention, gentlemen, to the fact that during the past year the Council of the City of Chicago has passed two ordinances, which will have a tendency to reduce the number of cases of serious eye diseases and blindness, and it is an ordinance which should be adopted, I believe, by practically every municipality of each city in the State of Illinois, and that is prohibiting the use of the so-called roller towel. The other is the ordinance requiring all medical attendants, physicians or midwives to report to the Commissioner of Health within twenty-four hours any case of sore eyes. Those two ordinances are now in force in the City of Chicago, and I believe will have a tendency to help along the propaganda of the prevention of blindness to some extent.

You have heard the resolution as submitted by Dr. Woodruff. Are you ready for the question? Those in favor of the resolution will manifest same by saying "Aye," contrary "No."

Carried.

TREATMENT OF CORNEAL ULCERS *

C. A. E. LESAGE, M.D.
DIXON, ILL.

The object of this paper is not to offer anything new in the treatment of corneal ulcers, but to present a working plan which the general practitioner may safely follow in the care of these cases coming so frequently under his observation. In considering the treatment of corneal ulcers, we will not attempt to discuss many of the agencies used in treating this condition but will consider only those that we have found by practical experience to be of value and will not necessarily mention others of decided merit.

It is of the greatest importance to determine whether we are dealing with an ulcer that is spreading or progressive or one that is healing or retrogressive. During the former stage, there is pain, lacrymation, photophobia, ciliary injection, and sluggish iris; the floor of the ulcer presents a yellowish or whitish appearance, is irregular and has areas of necrotic tissue presenting; should the destruction of the floor have been deep enough, the membrane of Descemet presents as a bead-like, transparent membrane, bulging above the surface; the edges of the ulcer are infiltrated, with radiating lines extending into the clear cornea, and at points where the ulcer is most active, we find the edges yellower and whiter and in some forms undermined.

When an ulcer is healing, the eye is less irritable, the symptoms just mentioned begin to abate, there is less pain, photophobia, lacrymation and ciliary injection, the iris reacts more readily, the floor and edges of the ulcer look cleaner, the necrotic tissue is cast off, and its place is refilled with new tissue; in the larger ulcers, blood-vessels may be seen running from the sclerocorneal margin to the floor and edges of the ulcer. To best determine the extent of an ulcer, we make use of a 2 per cent. solution of potassic fluorescide, one drop of which is dropped on the cornea and in a few moments it stains the affected area a yellowish green.

In the treatment of corneal ulcers it is first necessary to remove the cause which is frequently some foreign particle such as coal dust, chips of steel, emery dust, etc., or there may be displaced cilia scratching the cornea, the palpebral conjunctiva may be roughened; in some paralyses the lids may fail to close properly and permit injury to the cornea by dust, wind, etc., in which instances the eyeball should be protected by some form of pad. A suppurating tear sac should receive appropriate treatment.

As a general rule bandages should not be used in treating corneal ulcers but the eye is protected by eye shades, smoked glasses or some form of eye-pad. When the cornea has perforated or threatens to perforate, a bandage is indicated; a copious discharge is a contra-indication to the use of a bandage. Small abrasions of the cornea simply

* Read at the Sixty-Second Annual Meeting of the Illinois State Medical Society, at Springfield, May, 1912.

require the use of some mild antiseptic, as a 4 per cent. boric acid solution, and will usually heal over in a short time.

For cleansing the eye, many antiseptic washes have been used, but we believe it is not so much the antiseptic used which furnishes results as the thoroughness with which the cleansing is done. A freely discharging eye would require more frequent attention than one with a scanty discharge; the former might require irrigation every hour to keep it clean; as a general rule, cleansing every three hours will suffice. Strong antiseptics are objectionable; either hydrarg. bichlorid (1-10,000) or a 3 per cent. solution of boric acid forms a most efficient eye-wash. After cleansing the eye, we instil a solution of atropin sulphate.

Atropin sulphate is almost indispensable in the treatment of corneal ulcers; one drop of a 1 per cent. solution is dropped into the eye every three or four hours to keep the pupil dilated; it acts favorably by preventing or breaking up posterior synechia; in some cases it is used oftener at first, and at times even the pure crystal is used by the surgeon; after dropping in the atropin, we should carefully wipe off the lids to prevent an absorption of any excess of the drug which may cause poisoning in susceptible cases. In cases with glaucoma or total posterior synechia, the use of atropin is contraindicated. In cases with increased tension or threatened rupture we may alternate the use of atropin with eserin sulphate ½ grain to 1 grain to the ounce, continuing the use of the former as the tension lowers. Some surgeons favor the use of eserin in marginal ulcers with threatened perforation as being less likely to produce anterior synechia.

Another valuable adjunct is dionin; it has decided analgesic and curative properties in corneal ulcers, it seems to hasten repair by opening up the lymph spaces in the cornea, permitting a freer flow of lymph to the parts; in the later stages it assists in clearing up the cornea; it can be used in the form of solution or ointment, 5 to 10 per cent.; some surgeons employ the drug in powdered form. The ointment will be found a convenient form of administration; it produces a chemosis of the conjunctiva at times alarming to the patient, but it is this very reaction that is beneficial; it is used at first two or three times daily, depending on the reaction produced, and later, as repair progresses, the interval of application is lengthened. In the severer forms of ulcers we apply hot applications; cloths wrung out in hot water and frequently changed, are applied to the eye for 20 minutes to one-half hour, every two or three hours.

Some ulcers, in spite of the above treatment, will continue to spread and we should lose no time in adopting more active measures. After cocainizing the eye, the floor and edges of the ulcer should be thoroughly cureted and pure carbolic acid carefully applied by means of a tooth pick dipped in the acid and all excess removed; a still more efficient means of checking the ulcer consists in using the actual cautery, which is carefully applied to the diseased parts in the form of the galvano-cautery or a probe heated to a dull red. Sometimes when applying the actual cautery to the ulcer the eye will perforate, but this hastens recovery by

diminishing the tension of the eye. The instillation of a drop of a 2 per cent. solution of potassic fluorescid will aid in determining the limits of the ulcer before applying the cautery.

Subconjunctival Injections.—In the severer forms of ulcer, subconjunctival injections are beneficial; among some of the more widely used injections is cyanid of mercury and normal salt solution. H. W. Woodruff[1] uses the following method: "The conjunctiva is anesthetized by three or four instillations of a 4 per cent. cocain solution during ten or fifteen minutes; then 8 minims of a solution of cyanid of mercury (1 to 1,000) with 4 minims of a 4 per cent. cocain solution added are injected beneath the external conjunctival cul-de-sac with the hypodermic syringe; when the needle comes in contact with the external wall of the orbit, the point should be turned slightly inward and the needle plunged deeply into the tissues so that the injection is more than subconjunctival. The tissues of the orbit surrounding the eye-ball are bathed with this solution. The swelling and edema which follow are quite severe, but this is probably beneficial rather than injurious." After the injections a bandage is applied to the eye.

When an ulcer threatens to perforate, this is best anticipated by performing Saemisch's operation, which consists in making an incision through the floor of the ulcer; the knife, entering clear cornea on one side near the edge of the ulcer, emerges at a point opposite in clear cornea on the other side of the ulcer. Should a hypopyon be present, its contents may be removed at this time by manipulating the knife or by means of a forceps passed in through the wound, or the anterior chamber may be flushed with a normal salt solution; after instilling atropin, a compress bandage is applied to the eye. If the iris prolapses it should be replaced if possible, otherwise it is grasped with a forceps, gently pulled out and snipped off close to the cornea with a scissors and the edges carefully replaced.

Serums.—In our practice serums and vaccines have been used occasionally. Stock vaccines were used, but we cannot state definitely what part they played in the recovery of our patients, and therefore hesitate to recommend their use on our experience alone. Some surgeons report favorable results from their use and we hope their more extensive use will prove their value in the treatment of these cases.

After an ulcer has healed over and the lost tissue has been replaced, we make use of some stimulating application to hasten clearing of the cornea, such as a 1 per cent. ointment of yellow oxid of mercury accompanied with massage of the eye, three times daily; powdered calomel blown on the cornea and massage will serve the same purpose, but this is more irritating; dionin in the form of a 10 per cent. ointment or a solution also serves excellently; it can be used three times daily. In all cases strict attention should be paid to the constitutional treatment of the patient, proper care taken of the bowels, careful supervision of the diet and to those who are debilitated, anemic, etc., the administration of tonics of iron and strychnin is necessary.

1. Wood's Ophthalmic Therapeutics, p. 73.

DISCUSSION

Dr. H. W. Woodruff, Joliet: I would just like to emphasize some points in the doctor's paper. One is the importance of early treatment. Of course, that is so well understood as to perhaps be superfluous to mention, but you know how prone you are, if the ulcer does not look bad to you, to say, I will wait until tomorrow and see how it looks, until later nothing can save it. I think that leads us to another point the doctor did not say very much about, but I feel quite positively about it as being very important, and that is a bacteriologic examination of the ulcer should be made to determine the kind of infection. You know you may have one kind of process that is almost certain to destroy that eye and that is a pneumococcus infection. Of course, others may be equally virulent, but pneumococcus is always a bad actor in the cornea, as anywhere else. So I would suggest in any case of ulcer of the cornea, if it shows pneumococci, it should be treated early, radically, the same as you would treat any bad ulcer; that is by the galvanocautery. In that way an ulcer of small size is absolutely cured, because you can destroy all the area of infection and it simply has to stop and get well.

Now about paracentesis. Of course, when the ulcer is progressing very rapidly in spite of your cauterization and subconjunctival injections (and by the way after a subconjunctival injection the tension of the eye may become elevated and if the tension does become elevated then everything seems to stop), the eye will not get well with the elevation of tension and something has to be done, the most reasonable thing to do is a paracentesis and you can do this in two ways. You can make a paracentesis, as the doctor says, right through the corneal ulcer. But if the ulcer is small, then do it near the limbus. So we have two points to be gained by doing a paracentesis, one is the relief of tension and one is drainage. You have the additional advantage, if the incision is through the ulcer, of the aqueous constantly washing that wound and I think that is a factor also. We are told that following a cataract extraction if we have a non-healing corneal wound we never have infection and that must be by reason of the aqueous constantly washing the corneal wound.

I have used vaccines in corneal ulcer but always in connection with the other lines of treatment, so it is impossible to say what the effect has been. Some of these ulcers in which I have used it have gotten well and others not, but I believe they should be used.

Dr. C. D. Thomas, Peoria: Ulcers of the cornea are a good deal like the poor, we always have them with us in our work, and as they make up such a considerable part of our practice all of the time, it is well worth while to hear all of the various theories and to hear them discussed.

I have at this time a condition of ulceration of the cornea that is bothering me a great deal and I believe it falls a little bit out of the ordinary. It is in a man, aged 76 years, who was sick all winter with bronchitis and asthma. He is very much run down. The ulcer had a very considerable start before I saw the case. It is located in the arcus senilis and has passed all the way around the cornea. It has grown worse persistently. I have seen it now for a week and have tried various means—means usually successful with me in my treatment. First of all I used an anesthetic, then I used carbolic acid, and it repaired for a little while, but did not give anything of a permanent nature. I wish to ask the other members about this who have had some experience. I used the electric cautery and cauterized about one-half of the circumference of the cornea. I really felt that was all I dared to do. Perhaps I was mistaken, but I have not gained much benefit from that. It seems to me it is the worst form of case. I doubt very much by trying all means if I am going to get any beneficial result. I would like the opinion of some of the other members in that regard. There is really not more than one-third of the cornea not involved. There is not much of a purulent or mucopurulent discharge from the conjunctiva. Of course, I have used yellow oxid of mercury and argyrol and washed with boric acid solution and used atropin. I had one case formerly in Chicago for over a year in the eye and ear dispensary, which was treated there for a long while for ulcer of the cornea, and the secret of the success

of the treatment which I instituted in that case was putting eserin instead of atropin in the eye. Atropin had been used and of course the usual remedies.

Dr. Richard J. Tivnen, Chicago: I would like to suggest something along the line of the prevention of corneal ulcer. This section of the Illinois State Medical Society affords us an opportunity to suggest that some sort of legislation be enacted prohibiting workmen from interfering with eyes the victims of foreign bodies. We all know that foreign bodies are the fruitful source of the production of ulcers. Workmen need protection from injuries. We have an act about the eight-hour labor day, a child-labor act, and so on. It occurs to me it would not be amiss for this section to suggest that in all factories, all industrial institutions where workmen are commonly afflicted with foreign bodies in the eye, that a regulation be operative that no fellow workman be permitted to interfere with such an injured eye; that when so injured he immediately present himself at the office of the company and either the company physician or one whom the patient may select attend to the removal of the foreign body, but that under no circumstances should a fellow workman be permitted to interfere with that eye and endeavor to remove that foreign body.

Dr. Frederick A. Guthrie, LaSalle: Regarding these ulcerations of the cornea, I have about come to the conclusion that the only thing to do is antiseptic treatment. We have got to have an infection before we have an ulcer. Of course, that is not the only cause. There may be underlying causes, as poor nutrition, etc., but if you do not have infection you do not have an ulcer. I used to treat these ulcers a good deal according to the rules laid down in the text-books: hot irrigations, cauterization, and those things, and I never got any apparently good results. For the last two or three years I have used, besides this treatment, the irrigating of the conjunctival sac very thoroughly with a boric acid and 2 per cent. nitrate of silver solution painted on inside of lids every day or every second day, and since that time have been getting very much better results with corneal ulcer. I think the reason for that is that the nitrate of silver is more strongly antiseptic than anything we use in the eye in this condition. You all know it causes the coagulation of the albumin of the mucous membrane, causes a white membrane to form in a few minutes, and it can be taken out of the eye, and in that way we get rid of a great deal of infectious material. I have used it for two or three years and have had better results with it than with anything I have ever used.

As far as cauterizing these ulcers, I have practically given up the galvanocautery, except as mentioned by Dr. Woodruff in the case of a small ulcer, and get out the whole thing and do it right there and then. Later I used the tincture of iodin, and got very much better results than with carbolic acid. I have a great many ulcers in my practice, a good many coal miners, and there seems to be a peculiar kind of infection present which I have not determined, which makes those cases more than usually severe. I have followed out the line of treatment I have just mentioned and I get better results than before. Of course you have always the tear duct to think of in infections. If it is infected it has got to be taken care of. I had one case which illustrates this very well. The ulcer got practically well and for some reason I did not notice the tear duct and one morning the ulcer was reinfected and as bad as ever and I found that was where the infection was coming from. That only shows that every source of infection has got to be removed as soon as possible in these cases.

Dr. Willis O. Nance, Chicago: I did not understand from the doctor's paper how the nitrate of silver was applied. Is the lid everted and application made to the palpebral conjunctiva? I have never employed that method in corneal ulcer. I am inclined to think it well recommended. I am quite satisfied that the use of antiseptics as irrigations in the eye in cases of corneal ulcer have very little effect. I believe that the boric acid or bichlorid, or whatever solution may be used, simply washes out and gets rid of the secretion between the lids, and does very little good in curing the trouble. More active and stringent methods are necessary.

I want to emphasize with Dr. Woodruff the importance of making a bacteriologic examination in cases of ulcer. I am a believer in practical bacteriology, and if there is a practical instance in eye disease where it is necessary to make a bac-

teriologic examination, it is in cases of corneal ulcer. First, for the one reason Dr. Woodruff particularly called attention to, namely, to determine if you have a pneumococcus infection to deal with; if you have you must get busy at once and keep busy; if you do not you will lose the eye. Second, if there is any other virulent microorganism present, you ought to know what it is, because if it is present and treatment is not properly administered it is likely to have a very deleterious effect on the cornea and upon the eye. If the diplobacillus is present it ought to be known because if recognized it yields to proper treatment quickly. Zinc is a specific in cases of ulcer caused by this microorganism.

As to the use of the bandage I invariably employ it in the treatment of corneal ulcers. That is, I mean that in practically every case I do. I naturally would not use it in cases of gonorrheal infection of the eye or in other instances where there is a great deal of discharge. It is most natural that any friction of the cornea should be relieved, therefore I believe that the application of a bandage is one of the very essential things in the treatment of ulcer.

I also favor the employment of heat. I believe that the more or less continuous application of heat is of decided service. That does not mean the interrupted application of heat, an application for five minutes or ten minutes, but an application for at least a duration of thirty or forty minutes or longer or even continually. Interrupted use of heat, or the use of warm applications, I do not believe of very much value. By putting on very hot applications active stimulation is obtained thereby encouraging preservation of the integrity of the remaining healthy tissue.

As to eserin, I never use it in cases of corneal ulcer. I never have seen any indication for its use, and I am sure there are contraindications to its use. Severe corneal ulcer without involvement of the iris and ciliary body by contiguity is rare and with eserin it is possible to do a great deal of harm. Eserin may reduce tension of the eyeball and help the condition temporarily, but if the tension demands lowering, a paracentesis is indicated. There is no objection to doing this little operation; in fact, it has been in my experience a very satisfactory adjunct to the medicinal treatment of corneal ulcer.

Dr. George F. Suker, Chicago: The treatment of corneal ulcer is a very large field. I fully agree with the remarks of Dr. Guthrie, in reference to the use of nitrate of silver, but have used it in a very different manner. The more acute the inflammatory condition of the ulcer is, the stronger is the solution of silver I use. The silver solution is applied directly to the corneal ulcer and the excess is not flushed out as the applicator is just sufficiently saturated with silver to have it just thoroughly moistened. The silver may be used in solution of 30 to 40 to 60 grains to the ounce and applied either daily or every other day as the indications warrant. In the sluggish type of ulcer one can safely use the stronger silver solutions daily.

One need not fear the staining of the cornea in cautiously using these strong solutions of nitrate of silver. It is only the weaker solutions continuously used, from day to day, that have ever stained any cornea.

In the milder cases, when the inflammatory conditions are not so severe I am prone to use the argyrol crystals. The crystal, having been moistened with boric acid so as to dissolve every minute sharp point, is massaged into the corneal ulcer by means of a glass rod. This argyrol crystal massage can be applied once or twice daily as the case demands or conditions warrant.

In addition to the above one will frequently find that the long continued use of great heat is very beneficial, while in some cases the judicious use of ice cold applications for short periods, is beneficial.

A word or two in reference to the cautery, either electro or thermocautery. Both of these, unless used with the greatest caution and dexterity are apt to sacrifice too much healthy corneal tissue, abutting the ulcer, thus increasing the size of the opacity. A thorough curetting will accomplish as much as the cautery; for, after a thorough curettment it is advisable to apply either the argyrol crystal or the strong silver nitrate solution as above suggested.

Dr. Lesage (closing the discussion): I wish to thank the doctors for their very kind discussion of this paper. I have found that the continuous application of moist heat makes the skin sore, so I have been in the habit of using a hot water bag, and when the patient complains of the weight I often use bran bags, four or five inches square, and have three or four of them on hand; while one is in use the others are hot, and in this way you have a continuous supply of heat.

HEMORRHAGE AS A CAUSE OF BLINDNESS, WITH A REPORT OF A CASE *

CARROLL B. WELTON, M.D.

PEORIA, ILL.

Severe hemorrhages, especially if occurring in rapid succession, lead to extreme anemia and its consequences. One of the latter is its effect on the optic nerve, producing an atrophy with its accompanying blindness, either partial or complete. In loss of sight, after hemorrhage, both eyes in a great majority of cases are involved, although the trouble may appear in the one, several days before its fellow is affected. (Chevallereau,[1] Gellemaerts.[2]) Females are affected oftener than males and the greater number of cases occur between the ages of 40 and 50. These hemorrhages may have their origin in the stomach, intestinal tract, lungs, nose, uterus, veins as after venesection, and other surgical procedures, occasionally after injuries and it has followed after puncture of large ascitic masses of fluid (Deyl[3]). The blindness is more complete after hemorrhage from the stomach.

Hemorrhage which causes either partial or complete blindness is almost always of spontaneous origin. Defects of vision may occur after hemorrhage, which are only temporary, but are explained in that the circulation is soon reestablished. A case which I wish to present is as follows:

Man, aged 58 years, a farm hand who, eleven years before, while at his work became suddenly faint, suffered severe muscular weakness and vomited a considerable quantity of blood. He had to stop his work and go to his home where he again had an attack of hematemesis. One week later, he had another similar hemorrhage. In November, 1910, during a period of one week he had three more hemorrhages, vomiting the blood in each instance. The blood from these hemorrhages sometimes was black, and sometimes bright red in color, and these periods of vomiting would last, so the man states, from 5 to 15 minutes. The patient says that at no time did blood pass from the bowel. During the last one he became unconscious and remained in that condition for four days. When he again recovered consciousness, he found he was completely blind, even perception of light being impossible. He remained in this state for two weeks. Up to the time of the last hemorrhage, his vision had always been good.

On the fifteenth day, there was a change for the better, he being able to distinguish light and for a time, the vision gradually improved. In May, 1911, when I first saw him, the vision was R. 10/80, L. finger counting at three feet.

---

* Read at the Sixty-Second Annual Meeting of the Illinois Medical Society, at Springfield, May 21-23, 1912.

1. Chevallereau: "Sur un cas d'atrophie papillarie brusque consecutive á des hémorragies uterines," Arch. d'opht., Par. 1903, xxiii, 417.

2. Gellemaerts: "Atrophie optique suite de métrorragie," Policlin. Brux., 1904, 1, 375.

3. Deyl: System of Diseases of Eye (Norris and Oliver), 1900.

Previous History: He has always been a strong healthy man and he has never had any serious illness. His occupation has necessitated heavy labor. He indulges in alcoholic beverages and admits to having been intoxicated a number of times. He denies ever having had syphilis and he has no tubercular manifestations. He is married, and has nine living children, and there are four dead. Family history is negative, except that his father died of some stomach trouble at 55. He has never had any disease of the eye. The patient shows a marked anemia and has difficulty in getting about, feeling his way rather than seeing when he wishes to sit down or move around. He suffers now at times from attacks of vertigo accompanied with muscular weakness.

Examination of the eyes shows a marked contraction of the pupils, which have only a feeble reaction to light stimulus. Application of a solution of sulphate of atropin, produces only slight dilatation. Consensual reaction is absent. Both pupils react to convergence. The pupils are misshapen, being oval in the oblique meridians. There is a symmetrical atrophy of the iris stroma, around the pupillary border, crescentic in shape, and extending below nearly to the periphery, leaving a dark pigmented area. Tension is lowered. Ophthalmoscopic examination shows an atrophic whiteness of the nerve head in each eye. Media is hazy and no details of the fundus can be seen.

The patient was referred to an internist, Dr. George Parker, for examination and he reports "There is a myocarditis, with a generalized arteriosclerosis. There is no palpable tumor in the abdomen. Examination of urine is negative."

The involvement of the eyes after hemorrhage is not uncommon. Pergens,[4] in 1896, reported a series of sixty-four cases. However, Haab[5] failed to find a single instance of the disease among 60,000 clinic and private patients. In most cases, the advent of the visual disturbance does not follow immediately after the loss of blood, but manifests itself after a period of three or four days. It occurs also generally after successive bleedings, although it may appear after a single escape of blood (Kurtsinger,[6] Patterson,[7] De Schweinitz,[8] Weeks[9]). Where the interval between the hemorrhage and the onset of visual disturbance is a week or more, the probable degree of damage to sight is much greater. In my case no visual defect followed the first series of hemorrhages, but sudden blindness ensued after several more losses, ten years afterward.

In regard to the amount of blood lost, that is necessary to produce changes in the eye, nothing is positively known, as a physician is rarely present at the time and the statements of patients are inaccurate.

Partial loss of sight in one eye, following a few days after a hemorrhage from the bowel, is reported by Ellet,[10] in which case the patient lost only a teacupful of blood, and which that writer believes to be the primary cause. The connection of the small hemorrhage from the bowel in its relationship to the production of the visual disorder seems to be rather remote.

4. Pergens: Ann. d'oc., cxv, 1896.
5. Haab: Quoted by Sweet: "Optic Atrophy Following Intestinal Hemorrhage," Trans. Am. Ophth. Soc., Hartford, 1903, x, 183, 1 pl.
6. Kurtsinger: Beiträge zur augenheilkunde, Heft 53, 1902.
7. Patterson: "Blindness From Gastric Hemorrhage," Ophth. Record, 1909, 264.
8. De Schweinitz: Ibid., 1910, xix, 185.
9. Weeks: Text. Diseases of Eye, 1910.
10. Ellet: "A Case of Retinitis Proliferans with Pigmentation, following Hemorrhage from the Bowel," Ophth. Record, Jan., 1910.

A case is also reported by Moore,[11] in which sight disturbance followed in a patient who had been the subject for ten years of "bleeding piles." This case likewise is inconclusive.

A large quantity of blood must be lost to produce an anemia sufficient to interfere with the nutrition of the retina and optic nerve. We know that the organism can withstand a loss of 3 per cent. of the body weight without causing death (Howell[12]). When "bleeding" as a therapeutic measure was common, patients frequently suffered a loss of 30 ounces without any grave symptoms arising (Adami[13]).

It is well to note the singular fact that permanent visual defect scarcely ever follows postoperative hemorrhage. After some operative procedures at times large quantities of blood are lost, and the involvement of the eyes in so few of these cases, seems to be without explanation. In three cases of my own, in which, after removal of the tonsils especially severe hemorrhages occurred several hours after the patients had been removed from the operating-room, in none of these did any permanent visual defect take place.

An explanation, perhaps, of the non-involvement of the eyes in my cases and in cases of this character is in the early use of physiologic salt solution.

If the eyes are examined early with the ophthalmoscope, after severe hemorrhage, in some cases nothing pathologic is found. In others, paleness or edema of the disk and retina, with retinal hemorrhages, and even acute neuroretinitis is present. In a series of twenty-eight cases collected by Chevallereau,[1] retinal hemorrhages were present in three. Considerable change may be present in the fundus, without any disturbance of vision. The visual fields are reduced in some cases but very little, while in others to purely tubular—10″—15″.

Complete loss of vision occurs in about 50 per cent. of cases (Singer,[14] Fries[15]). About 30 per cent. recover partially and 15 per cent. regain their vision completely. Complete restoration of sight, however, has never been recorded after hemorrhage from the stomach (Gowers). Nystagmus has been observed to develop in these blind eyes in some cases (Chevallereau[1]).

The pathology of the production of amblyopia after hemorrhage is not clear. Of course, insufficient blood-supply of the cerebral cortex and retina is the primary factor in the production of this form of blindness. This is shown in that if a sufficient circulation is not soon established (lowering of the head, use of physiologic salt solution, etc.) the prognosis becomes much worse. When the blindness follows immediately after the hemorrhage the cause is thought to be an ischemia of the nerve, and when the visual disorder appears later, it is supposed to be due to hemorrhages

11. Moore: Two Cases of Severe Loss of Sight Following Loss of Blood, Trans. Ophth. Soc. of United Kingdom, xxxi, Fasc. i, 1911, 39.
12. Howell: Text-Book, Physiology, 1910, 453.
13. Adami: Principles of Pathology, 1911.
14. Singer: Text-Book, Diseases of Eye (Weeks).
15. Fries: Klinische monatsbl. für Augenheilkunde, Aug., 1876.

into the nerves, nerve centers or intervaginal space from malnutrition of the vessel walls. The time of onset of amblyopia in regard to its early or late appearance (Fries[15]) is certainly of importance and two separate and distinct etiologic factors are shown.

On anatomical examination, Hirschberg[16] and Chevallereau found optic atrophy. Chevallereau also found vessels of different caliber in the atrophic portion of the optic nerve with thickened walls, but no obliteration of their canals. The hypothesis that contraction of the minor blood-vessels occurs under the influence of a hemorrhage, he believes has therefore been confirmed by anatomical proof.

The action of bleeding is not by diminishing the blood in circulation, but by contraction of the smaller vessels, as shown by the paleness of the face and extremities and sometimes by syncope.

Raehlmann[17] found changes in the blood-vessels. Schmidt-Rimpler[18] edema of visual centers. Zeigler,[19] Scagliosi[20] and Holden[21] found degeneration of the ganglion cells and nerve fiber layer (Chevallereau). Holden supports this theory of the mode of blindness, after loss of blood, by positive experiments on dogs and rabbits. In his work, with which you are all familiar, he subjected a series of dogs to loss of blood. "One or two days after a single profuse hemorrhage, signs of edema of the nerve fiber and ganglion cell layers of the retina were present and some of the ganglion cells showed evidence of beginning degeneration. The vision fails in the entire field. At first ophthalmoscopic changes are wanting or if present consist in slight edema of the retina with or without hemorrhages and in narrowing of the retinal arteries and pallor of the disk." Weeks[9] concludes from the findings of these observers that "it is fully recognized" as being a trophic disturbance (Sweet[5]), resulting in degeneration of the ganglion cells of the retina and secondary atrophy of the optic nerve (Parsons[22]).

However, these findings cannot be accepted as final, nor as offering a modus operandi in all cases. Bouveret,[23] for example, has demonstrated an edema of the brain as the only change found in a case in which aphasia and hemiplegia had developed after a copius hemorrhage from the stomach.

Treatment is of no avail if the case is not seen early. The proper position of the patient, physiologic salt solution, either intravenous or subcutaneous and the use of supportive measures are of value immediately after the hemorrhage. Terson,[24] by this means, claims to have been able to save the sight in such a case. Chevallereau advocates the use of nitrite of amyl to combat contraction of the minor blood-vessels and theoretically it would seem to be of value. Iron, arsenous acid, strychnin

16. Hirschberg: Bericht der Ophthalmoloxische Gesellschaft zu Heidelberg, 1877.
17. Raehlmann: Fortschr. d. med., vii, 1889.
18. Schmidt-Rimpler: Klin. Monatsbl. für Augenheilk., xxv, 1887.
19. Zeigler: Beitrage zur Path. Anat. u. Phys., ii, 1, 57.
20. Scagliosi: Nerven Krankheiten, 1905, 724.
21. Holden: Arch. für Augenheilkunde, xi, 1889.
22. Parsons: Pathology of the Eye, 1908.
23. Bouveret: Nerven krankheiten, 1905, 724.
24. Terson: Clinical Symptomatology, 1911, 529.

and potassium iodid are perhaps useful, especially in the cases when only partial loss of vision occurs.

Surgeons should always bear in mind the possibility of blindness following hemorrhages after abdominal operations, particularly in cases of strangulated hernia, after which loss of blood of gastric origin may occur. They should also keep in mind the need of early measures of relief, if the latter are to be of any benefit.

427 Jefferson Building.

DISCUSSION

Dr. Casey Wood, Chicago: I have always been greatly interested in the subject of blindness following hemorrhage. I remember one case where I can definitely say that blindness followed an excessive loss of blood. This accident occurred in a woman, 45 years of age, who had carcinoma of the stomach. By the way, let me say that my investigation of this matter shows that the most marked cases, the cases one feels surest of, follow hemorrhage from either an ulcer or a malignant disease of this organ. In this case both eyes were affected, and the optic atrophy was almost total.

I would like to ask Dr. Welton the character of the fields in the case he reports.

Just why we should have blindness following hemorrhage in apparently healthy individuals has always been a mystery to me. I happened to be in New York attending a meeting of the Academy of Medicine when Weeks presented the paper referred to by the essayist. Weeks believed the consensus of opinion indicated that the more one inquires into the cause of blindness following hemorrhage the deeper the mystery grows. My own idea is in cases where optic atrophy follows hemorrhage one deals with a pure idiosyncrasy. When thousands of people suffer seriously from stomach ulcer, and extreme loss of blood from other causes, why should secondary affections of the optic nerve be so very uncommon?

One must, I am sure, predicate some definite contributing cause, as indicated, for instance, in Dr. Welton's case of marked arteriosclerosis, and the question is whether it really had anything to do with the blindness.

With reference to experiments on dogs I have to protest against the doctor's conclusion. The dog's eye is entirely different from the human eye; the histology is different, the arrangement of the blood-vessels and lymph spaces are entirely different. Between ourselves, I think nine-tenths of the experiments on animals are absolutely worthless so far as concerns the eye.

Dr. W. L. Ballenger, Chicago: The doctor referred to nystagmus as a symptom. We have recognized at least three types of nystagmus, and I would like to know which type was present. There is ocular nystagmus; then there is vestibular nystagmus which is due to otitic disease always. Then we have cerebellar nystagmus. It is interesting to know which type of nystagmus was present in this case. It was probably an ocular nystagmus.

Dr. Welton (closing the discussion): I have not very much to add. I would like to state that we tried to get this man into the hospital, but he absolutely refused to go. He was sent to a general diagnostician to ascertain just what the general condition was and I suspected some gastric trouble, probably, a cancer, but repeated efforts to get him into the hospital for examination failed, so I cannot tell you what the general condition was. The fields of this man could not be taken. The man's mind was dull, and that has happened in some cases that have been reported. Patterson reports a case in which the mind was markedly affected. In this man we could get nothing when we attempted to get his field.

As to the kind of nystagmus that was present, I do not know. I expect it was an ocular nystagmus.

THE TREATMENT OF SECONDARY DIVERGENT STRABISMUS *

H. W. Woodruff, M.D.

JOLIET, ILL.

Within the past year I have had the satisfaction of adding something to my own experience in correcting cases of divergent strabismus which followed on tenotomies for the cure of the convergent variety.

I would hesitate to present this subject were it not for the fact that I formerly looked on these conditions as difficult to correct and rather more unsatisfactory than the primary variety to both patient and surgeon. In the light of this recent experience I now consider them of all kinds of strabismus the most satisfactory.

Text-book instruction is quite thorough as to prophylaxis and indeed ophthalmic literature for several years has been replete with suggestions as to the method or methods by which convergent strabismus can be corrected without danger of over-effect.

Tenotomy of an internal rectus muscle is, considering its simplicity, one of the most uncertain in its remote effects. This fact is so well recognized that many, following the teaching of Landolt, have almost abandoned tenotomy in favor of advancement or shortening operations. As these teachings are more and more followed secondary divergence will occur less frequently.

Others who still prefer tenotomy confine the procedure to the tendon itself and are satisfied with an under-correction, preferring this rather than a remote divergence, which is certain to follow a case completely corrected by tenotomy. Then, too, the operation is not performed in the very young and in no instance without a preceding correction of the existing refractive error. As a beginner in ophthalmology, I remember administering a general anesthetic to a baby but a few months old, while the attending oculist performed very complete tenotomies of both internal recti muscles. I have often wondered since if I could have been held as a participator in that crime or not. I am glad to say, however, that it is chiefly to the charlatan that I am indebted for the material which affords the basis of this paper.

It is the man who cures strabismus in one minute without the use of the knife who is the chief offender. One in particular, who fifteen to twenty years ago, left a trail from Cairo to Chicago marked by scarred conjunctivæ, sunken carunculæ, protruding and diverging "windows of the soul," as they are pleased to call them. If any of you present have crossed this modern John Taylor's path or a similar one you must have encountered a number of these cases. Almost daily I see on the street a young woman who was operated on by this quack for convergent strabismus. She has since been operated on twice, according to his own statement, by an oculist in the northern part of this state, but with no appreciable result. At the November, 1911, meeting of the Chicago

* Read at the Sixty-Second Annual Meeting of the Illinois State Medical Society, at Springfield, May, 1912.

Ophthalmogical Society, I presented a case of this kind on which I had operated the previous August. The method of operating and the result obtained brought out such favorable comment that, on the invitation of your chairman, I present the subject again with a report of two additional cases. I shall, however, disclaim anything new in this operation, and it is only to call attention to its simplicity and certain success which follows that I trespass on your time.

The method followed in the "reattachment operation" is as follows: After obtaining anesthesia by instillation of 4 per cent. cocain solution, a subconjunctival injection of 1 per cent. cocain with 5 drops of adrenalin solution 1 to 1,000, should be injected beneath the conjunctiva in the operation field. After massaging the resultant swelling for a few minutes, a vertical incision is made in the conjunctiva only over the site of the old muscle insertion at least 20 mm. in length. The conjunctiva is dissected from the capsule of Tenon well underneath the caruncle. The capsule is then picked up with the forceps and dissected from the sclera until all capsular and muscular adhesions are loosened from the sclera. Two horizontal incisions are made in the capsule corresponding to the normal position of the muscle borders, but somewhat wider than the tendon itself. This cut may extend as far as the caruncle itself. This gives a tongue-shape flap, which somewhere near the caruncle must contain the retracted internal rectus muscle.

The conjunctival flap, entirely separated from the capsule, is held out of the way by an assistant. The tongue-shaped flap containing tendon and capsule is held up by broad forceps while sutures are inserted (No. 00 formalized pyoktanin catgut) from beneath outward, but not through the conjunctiva. If the special needle here shown is used, the sutures can be placed far back beneath the caruncle. Two of these sutures are placed, one in the upper portion of the flap and one below, and tied according to the Worth method. These sutures are inserted in the sclera not at the limbus, but over the site of the original insertion of the tendon. Just before they are tied a third one in the form of a mattress suture should be passed between the other two and tied in the same manner. When these three sutures are drawn tightly and tied in three knots the eye-ball is brought back into the proper position. The conjunctival flap is replaced with silk sutures. If the caruncle is still sunken it may be drawn forward by the central conjunctival suture sufficient to relieve that deformity. During the operation a portion of the tongue of capsule may be removed if it is so excessive as to cause much bunching, which, however, will later disappear. It is best to apply a binocular bandage for forty-eight hours. The external rectus is tenotomized or not, according to the immediate effect of the advancement.

REPORT OF CASES

Case 1.—J. A. M., aged 31 years. R. V. 6/6+75+25 cylinder ax. 90=6/6. L. V. =6/6+50 cylinder ax. 90=6/5.

Has 25° of divergence, alternating but uses the left eye mostly. Sunken caruncle, slight exophthalmus, adductive power limited in the right eye. Patient said his eyes turned in since his earliest remembrance. When a child had an

operation in Chicago, probably a tenotomy of right internal rectus, which did not cure his condition. When he was 16 years of age another tenotomy was performed on the same muscle by a quack. This was followed by a divergence which was operated on by the method above described on June 1, 1911. For the central suture I used silk and included the conjunctiva for the purpose of drawing forward the sunken caruncle. The result almost one year after the operation is perfect from a cosmetic standpoint.

CASE 2.—Dr. K. Convergent strabismus of the right eye during childhood up to 18 years of age, when he was operated on by an advertising quack by a tenotomy of the internal rectus of the right eye. This resulted in a divergence of 45°, exophthalmus, sunken caruncle and no power of adduction beyond the medium plane. A reattachment of the muscle and capsule made in August, 1911, with a tenotomy of the external rectus gave a satisfactory result. The power of adduction was not completely restored. This case was the one shown at the November meeting of the Ophthalmological Society.

CASE 3.—John R., aged 30 years, April 24, 1912, came to the Eye and Ear Infirmary with a pneumococcus conjunctivitis of the left eye. Divergent strabismus R. E. 35°.

R. V.=2/200+250+75 ax. 60=20/200.

L. V.=20/15+250+50 ax. 90=20/15.

There was a history of an operation for cross-eyes when two years of age. Examination showed divergent strabismus of the R. E., and scars over the original insertion of both internal recti muscles. Adduction was impaired in both eyes. Replacement of both internal recti was performed; one May 3, the other May 10. The external recti were not tenotomized. No tenotomy was performed on the external recti muscles and a slight under-correction was the result.

I am well aware that there is nothing startling in the report of these cases or in the operation, but the following factors may be worthy of special consideration:

1. These cases are all adults, so that local anesthesia is sufficient, especially if a subconjunctival injection is made of cocain and adrenalin.

2. The conjunctiva is not advanced unless necessary on account of sunken caruncle.

3. No attempt is made to dissect out the tendon or muscle. The tendon and muscles must lie in the capsule.

4. The suture must be placed far enough back beneath the caruncle and then sufficient tissue will be obtained to give the desired effect.

5. Place the attachment of the flap over the site of old insertion.

6. If the effect is not sufficient a tenotomy of the external rectus is indicated.

7. The length of time following the original tenotomy does not make any difference in the result. The muscle does not atrophy. If it does it is only a simple atrophy and soon regains its function at least to a degree. In the first case fifteen years had elapsed after the second and damaging tenotomy; in the second case, nineteen years, and in the third case, twenty-eight years. I believe action can be restored to the muscles after any period of time.

One week ago last Monday a man, aged 29, presented himself at the clinic with a history of having had his eyes operated on four days before for cross-eyes dating back to childhood. As the operation was so recent the internal recti were readily drawn forward sufficiently to leave a slight

convergence. Patient had a high degree of hypermetropia. This makes four cases that I have seen in one year and have operated on. None of them had been in the hands of reputable oculists.

DISCUSSION

Dr. Richard J. Tivnen, Chicago: As usual, our friend Dr. Woodruff has presented to us something that is interesting and very practical. This has gotten to be a habit with the doctor.

The closing statement of his paper, namely, that of the four cases which he had operated on none had been in the hands of reputable physicians, is certainly very gratifying. This John Taylor he refers to was a faker who lived at Joliet, and some of you I am sure have run across his trail. I only wish to make reference to this doctor and say that he removed from Joliet shortly after Dr. Woodruff arrived. You can readily guess the reason.

The work that Dr. Woodruff has done in this particularly discouraging field is one that should excite our interest, because it is in a class of cases that we are all very likely to shirk operation. Most of these cases are very difficult. We have been possessed with the idea that the muscle had atrophied. Dr. Woodruff tells us that this is not true, and he believes the muscle may be at any time restored to adduction. One case he cited I notice was some twenty years old. I had two cases, both as it happened, from Joliet, both operated on by this modern John Taylor, and both operated on when they were little children. One came for operation to me some twelve years after the original operation, and the other some fourteen years. I used practically the same method Dr. Woodruff described. I used a long sharp pointed hook, I cannot think of the name just at present, with which I could easily grasp the muscle and I was able to bring it forward. I was able to get a good result in one of these cases, but only a fair one in the other. It seems to me it would be well to do a tenotomy in nearly all of these cases. The tension on the advancement suture is such that we would likely bring about more certain results if that tension was relieved, by combining at least a partial tenotomy.

I enjoyed the paper very much. I have seen one of the doctor's cases, and were it not for the fact that I know him so well and had also seen the case I would not think he had operated at all as the result is so beautiful.

A Doctor: I would like to ask Dr. Woodruff if in any of these cases the patients complained of diplopia. I had in mind a case with a double tenotomy about eight years ago which I saw two months ago. Her chief complaint was diplopia. She is a domestic, and you can imagine about what happens in the kitchen—it was a continual breaking of dishes. She came to me with the idea of having a secondary operation. She wanted to know if I could guarantee the diplopia would disappear. Of course, I would not insure her whether it would relieve her of the diplopia or not.

Dr. George F. Suker, Chicago: I think the section ought to well heed the remarks made by Dr. Woodruff. I complimented him some time ago and encouraged him in doing that work. He seemed to hesitate in bringing it before us to-day because he had brought it before the Chicago Ophthalmological Society some time ago. He has developed in that operation some certain anatomical technical points which we have forgotten in our anatomy. He tells us in dissecting the muscle to attempt to get the muscle fibers, to make a parallel incision through the capsule and through the tissues in which the muscle lies, because after a tenotomy you have a certain amount of adhesion between the capsule and the muscle itself.

The doctor has been very technical about the matter; whether he realizes it or not he has certainly not gone wrong as far as the physical principles of the operation are concerned. It gives you excellent results every single time if you carry out the principles and technic he has laid down for us.

Dr. Sterling, Pontiac: I wish to say that all of the tenotomies are not limited to quacks. I saw one of our eminent surgeons do a similar operation last fall.

There were some visitors here on the way back from Los Angeles and they stopped to see one of the best operators in this country and he did this operation. Some of these patients come from the hands of the so-called most reputable men we have. I have now five cases, all from the hands of as well known ophthalmologists as we have. Three of these cases were operated on by this man in the same day, without any examination as to the refraction and without anything more than a simple glance at the eye, and he told them they needed an operation. In none was there diplopia or a history of a headache or that they might need glasses; three were operated on one day and two of them were operated on the second day. Three cases are in the hands of a neurologist today; the other two cases are in the hands of the same man and are more or less subjects for the neurologist.

Dr. Woodruff (closing the discussion): I wish to thank the gentlemen for the discussion of my paper. The question of diplopia only entered into one of these cases. Of course, you are certain to have diplopia if your patient has a 6/6 vision, or approximately the same vision in each eye. If your patient has good vision in each eye you can be sure you are going to have diplopia. This was so in the first case I reported here; this young man had diplopia, but he has gotten to a point, after one year, where he says it does not annoy him and he is so much better satisfied and his personal appearance has improved and that he does not find any particular fault with that diplopia.

The reference the doctor makes as to others besides irregulars doing the operation, I must confess that I have done it myself, but not, of course, of late years; that was at the time I commenced to practice ophthalmology, up to the time something was said about the dangers of tenotomies—and it took a little while before we learned about the dangers—but this does not happen now, because if you do a tenotomy and an over-effect is obtained, you will at once rectify that condition.

THE TRAUMATIC DISLOCATION OF THE CRYSTALLINE LENS WITHOUT RUPTURE OF THE EYE-BALL; WITH REPORT OF A CASE*

C. F. BURKHARDT, M.D.
EFFINGHAM, ILL.

Injuries to the eye present such an infinite number of possibilities and conditions, so many variations in course, extent, symptoms and complications, that while we may acquire some valuable information from experience and may formulate certain rules and methods of treatment applicable to many conditions, still each eye injury is usually a law unto itself.

The injuries to the eye for all practical purposes may be classified under two classes or divisions:

First, those penetrating the eye-ball.

Second, those that do not penetrate the eye-ball.

These ocular traumatisms are more numerous than in former years due to the greater number of mechanical inventions, etc. The clinical pictures resulting from traumatic injury to the eye are practically without number.

The difference in structure and the even greater difference in the inflicting agents make the compilation of a complete list of eye injuries impossible. One authority has been able to name seventy different pathologic conditions of the eye and orbit caused by bullet wounds alone.

* Read at the Sixty-Second Annual Meeting of the Illinois Medical Society, at Springfield, May 21-23, 1912.

Therefore, owing to the great multiplicity of the conditions resulting from traumatic injuries to the eye, I will attempt in this paper to present but one of the serious conditions resulting from trauma; namely, the dislocation of the crystalline lens without rupture or penetration of the eye-ball.

This character of injury is usually caused by concussion, that is, by a substance striking the cornea or sclera and bounding off without penetrating; the cornea usually being the point of resistance. The cornea is of such a tenacious and elastic character it can withstand a sufficient blow or force without penetration of its tissue to dislocate the lens completely and even cause the fragmentation of the lens matter, which was true in the case I will report. In cases where there is fragmentation of the lens they are usually the result of injuries from shot striking the cornea without sufficient force to enter. Blows which strike the eye-ball when the lids are closed may also produce the dislocation of the lens.

I have had during the past year one case under my care which I consider of sufficient interest to report the history and treatment of.

D. B., aged 11 years, was accidently shot in the left eye Feb. 25, 1911, while handling an air-gun, the muzzle being almost in contact with the eye. I saw him a short time after the injury. There was no penetrating wound of the cornea or sclera, only a slight abrasion of the cornea where the shot first struck and glanced off. The examination of the interior of the eye was impossible, as the anterior chamber was filled with blood. Vision was reduced to perception of light. After a few days, when the blood had been absorbed, the lens could be seen completely dislocated. The horizontal axis of the lens pointed directly anteriorly and posteriorly. About half of the lens was above the iris and half below. The lens had a striated appearance which later proved to be due to its fragmentation. There was also a large coloboma of the iris to the nasal side.

Treatment: Atropin and the application of cold compresses. After the inflammation had subsided it became a question about the removal of the lens matter, but after consultation it was decided to watch and see if nature would remove the lens matter by absorption, and I am glad to be able to make the statement that at the expiration of eight months after the injury the lens matter had been absorbed. The only trace of the lens that can be now made out is very tiny shreds in the anterior chamber, which are evidently the unabsorbed parts of the capsule. The coloboma of the iris still exists. The vision without the aid of a lens at the present time is the counting of fingers at ten feet; with a plus ten lens it is six-twentieths.

The case which I have reported is a very rare one, owing to the fact that the fragmentation of the lens matter and the complete rupture of the capsule were equivalent to a needling operation, with the exception that there was no puncturing wound. And as the patient was young, the percentage of insoluble lens matter was at its minimum.

Diagnosis.—The examination of these cases immediately after injury is indeed very difficult, owing to the hemorrhages into the anterior chamber, which come from the injury to the blood-vessels of the ciliary body and iris, which seldom escapes injury. It may be several days before we are able to make a definite diagnosis of the condition, unless the lens is completely dislocated into the anterior chamber. When the blood has been absorbed we may find any one of the following conditions:

First, a partial dislocation or tilting of lens.

Second, a complete dislocation of lens posteriorly into the vitreous.

Third, anteriorly into the anterior chamber and in very rare cases attended by rupture of the sclera, it may lie beneath the conjunctiva.

Laceration of the iris is a common complication in these injuries, especially if the lens is found in the anterior chamber.

Prognosis.—The prognosis of these cases is necessarily grave. There can be no hope held out for the complete restoration of vision. Of course, these injuries to the lens without rupture or penetration of the globe are not so serious, as there is practically no danger of infection from without, while sympathetic inflammation is fortunately rare. In 280,452 cases of eye affections recorded at the New York Eye and Ear Infirmary, sympathetic inflammation occurred five times. At the Ophthalmic and Aural Institute, in 86,127 cases, sympathetic inflammation occurred four times. Mooren reports 146 cases in 108,416 patients seen in private and hospital practice. But we realize that while it does occur very rarely, yet when it does occur it is one of the most serious conditions that the ophthalmologist encounters, as one of the chief causes of sympathetic inflammation is an injury to the ciliary zone resulting in cyclitis or iridocyclitis, which is frequently of a violent character, following these injuries. Therefore, it is important in handling these cases that we see the patient at least once a day until the active inflammatory stage is passed that we may detect the first signs of danger, such as irritation and lowering of vision in the uninjured eye.

Treatment.—From the very nature of these injuries it would seem at first thought the thing to do would be to remove the lens in all cases, but if the lens is not producing pressure, as may be the case in complete dislocation of the lens into the anterior chamber, as in this position it is apt to set up an irritation and may especially do so if the lens be a large one by occluding the filtration angle and give rise to glaucomatous symptoms, and also when the lens is in the vitreous. Of course, where these conditions exist or whenever the position of the dislocated lens causes continued irritation, removal at once may become imperative, but unless this condition does exist a conservative course of treatment should be adopted and carried out, atropin being the principal drug together with the application of cold compresses, the atropin to be continued until all inflammation subsides. The danger of interference by radical measures to simply restore vision until the eye is completely quiescent, in my judgment, has never been exaggerated.

DISCUSSION

Dr. George F. Suker, of Chicago, said it was rather surprising that subluxation and even dislocation were relatively rare considering the frequent injuries from blows as far as the eye was concerned. He believed that in subluxation and dislocation from injuries of this kind there was an inherent anatomical defect in the suspensory ligament. These injuries always entailed more or less damage to the ciliary bodies and processes because of the tension of the blow resulting in detrimental inflammatory processes. It was certainly dangerous to immediately enter an eye that had a dislocated lens for the removal of the same, be it in the anterior chamber or the vitreous chamber. It was far better to abide one's time

and let the first surgical reaction from the trauma subside, which was usually in twelve or twenty-four hours, and then attack it. In the subject of subluxation of the lens the question that arose was, What to do. He did not think it was good policy in moderate subluxation of the lens to go in and endeavor to extract it, as one was liable to meet a good many more difficulties than otherwise. A partial subluxation of the lens might remain almost indefinitely without the complete formation of a cataract and if the patient had good vision in the other eye it was absolutely unnecessary to remove subluxated lens unless pathologic conditions demanded it.

Dr. A. B. Middleton, Pontiac, Illinois: I think the low percentage of cases that might develop sympathetic ophthalmia in the doctor's paper is misleading. The percentage of sympathetic ophthalmia cases that might develop must not be judged from a percentage of eyes that are simply inflamed, but the percentage of eyes that have had penetrating injuries.

Dr. Benj. Gleeson, Danville: I wish to report a case I had three months ago of subluxation of the lens in a man 30 years of age, who was thrown from the top of a box car on which he was riding, and struck against an iron rail. I saw the man two or three weeks after the accident. He was taken to the hospital in ample time and treated for the external wound; no attention was paid to the eye. Two or three weeks after the accident I saw him with this condition present. He had a complete rupture of the sphincter of the iris with a general iridocyclitis. He had a good deal of pain which usually accompanies iridocyclitis. I watched him for two weeks with the application of atropin and ice, but the iridocyclitis continued to get worse. I made an ordinary cataract incision in the lower portion of the cornea and with the loop and hook introduced I removed the lens practically in toto. In four or five days the cornea healed. The iridocyclitis completely subsided and his vision with the glass is about 20/100.

Dr. Richard J. Tivnen, Chicago: On the point of how much the eye may tolerate dislocation or subluxation of the lens I simply mention the case of a young man, aged 23 years. I saw this patient just before I came to this city. I did not go into the history or make a complete examination, but he told me he had the affliction as far back as he could remember—presumably a congenital affair. The lenses of both eyes were dislocated downward and to the temporal side. I talked the matter over with Dr. Woodruff (H. W.) and he suggested having the patient in the recumbent position and endeavor to get the lens in the anterior chamber, then using eserin and needle or extract, preferably extracting.

Dr. Frederick A. Guthrie, LaSalle, Illinois: This case reminds me of a case that came to me. A man, aged 50 years, was working in the yard; he fell, striking something which penetrated the eye. I did not see him for twenty-four hours. When I saw him there was a perforation at the superior part of the cornea, near the corneoscleral junction. I sent him to the hospital and did an iridectomy, and I found the lens beneath the conjunctiva three or four millimeters from the corneoscleral margin. I removed the lens. The man recovered and with a correcting lens he was able to read 20/30 with that eye. That was four or five years ago and there has been no reaction since. That was, I think, a rather unusual case where the lens was extracted from beneath the conjunctiva, where the injury was done by some foreign body.

Dr. Willis O. Nance, Chicago: Personally, I have had two cases of dislocation of the lens in the anterior chamber and strangely they both came under my care within three months. These are the only cases of that kind I have ever had in my private practice. In both instances the lens was removed by paracentesis of the anterior chamber and good vision resulted in both cases. One was a man whose fellow eye was removed a number of years before on account of an injury. The second case was that of a boy who retired one evening and the next morning some one called attention to the fact that the eye was red and it developed that the lens had dislocated into the anterior chamber. So far as dislocation in the vitreous is concerned I have seen a number of these cases, and I thoroughly agree that in a case of this kind we should leave the lens absolutely alone. I

have made attempts to remove lenses dislocated in the vitreous and have been unable to accomplish any favorable results. These lenses will remain in the vitreous for years without causing trouble and anyone who has ever tried to remove a lens so situated knows how exceedingly difficult it is to accomplish his purpose.

Dr. Burkhardt (closing the discussion): I wish to thank Dr. Suker for opening the discussion, and next I will answer Dr. Middleton on the objections he raises to my placing the percentage of sympathetic ophthalmia or sympathetic inflammation perhaps too low. I wish to say that I want to impress upon the gentlemen that in my paper I only brought out the dangers that we might have to consider in regard to dislocation of the lens without rupture of the eyeball, which is much less than it would be in a case of dislocation with rupture, as in a dislocation with rupture we have the danger of infection from without, and while it is true that Dr. Middleton's objections are perhaps well taken, yet I think he misunderstood my position in the paper. I only give a number of recorded cases, including all classes of eye cases.

I want to thank the gentlemen for their kindly discussion.

THE CHICAGO EPIDEMIC OF SEPTIC SORE THROAT WITH ESPECIAL REFERENCE TO ITS PATHOLOGY AND BACTERIOLOGY *

DAVID J. DAVIS, M.D.
(From the Laboratory of St. Luke's Hospital, Chicago.)
CHICAGO

During the past winter (1911-12) especially the latter part of December and in January there was noted at St. Luke's Hospital an unusually large number of cases of streptococcus infections. This was practically coincident with the occurrence in the city of many cases of sore throat as numerous physicians at that time were noting. About the middle of January my interest was further stimulated by a number of deaths at the hospital, and autopsy on three cases within a period of about ten days revealed in all acute peritonitis from which a streptococcus having certain peculiar features was isolated in pure culture. Furthermore all gave a history of sore throat or tonsillitis a short time previously. A number of other similar fatal cases occurred about the city at that time from some of which I was able to obtain cultures, and they likewise showed this streptococcus as the infecting organism. In discussing the matter about this time with Dr. Rosenow of the Memorial Institute for Infectious Diseases, it was learned that he had had a similar experience as regards cases of streptococcus infection and had likewise independently noted the peculiar properties of the streptococci found. This led to our publication of a brief statement on this subject, which appeared in *The Journal A. M. A.*, lviii, 773, March 16, 1912.

* Read at the meeting of the Chicago Laryngological and Otological Society, April 16, 1912.

I have been interested in this epidemic chiefly from the bacteriologic and pathologic side and will only very briefly refer to a few of the clinical features. The attack of sore throat usually begins suddenly, not infrequently with a chill. The muscular pains, the prostration and the constitutional symptoms are commonly out of all proportion to what one would expect from the local involvement. The fever ranges from 101 to 103 F. or higher, and the pulse is relatively slow. The leukocyte count generally may be said to be low though considerable variation was noted and especially where complications were present the count may be very high, reaching in two cases observed nearly 60,000 with a high polynucleosis. The infection may be largely limited to the tonsils, which are red and swollen, and often a grayish exudate in spots or diffuse is present. Not infrequently the involvement is extensive, the whole throat being red and more or less uniformly inflamed. It is common for the acute symptoms to subside in a few days without further trouble. Often, however, perhaps at the end of a week or ten days, the patient may become worse and it is now that the cervical glands are prone to become enlarged, firm, possibly tender, and may suppurate. At this time, too, numerous other and varied complications are apt to arise. These include empyema, peritonitis, meningitis, otitis media, bronchopneumonia, arthritis, erysipelas, septicemia, etc.

The bacteriologic examination in these cases always yields streptococci. A large number of strains have been isolated and studied with interesting results. In the complications and in all the fatal cases and from many but not all throats the streptococcus found has certain peculiarities by which it may be differentiated from ordinary streptococci. Morphologically in the smears from the throat and the exudates it usually occurs in pairs or very short chains and may be slightly lanceolate in form. In the chains the cocci are arranged in twos. They are strongly Gram positive and surrounded by a definite capsule. The capsular substance is distinct but less abundant than that surrounding the streptococcus mucosus. It is also less abundant than that about pneumococci and does not indent between the pairs as does the pneumococcus capsule. On artificial cultivation the capsule seems to be readily lost, but, in the case at least of some strains, it may reappear on subsequent passage through animals.

On artificial cultivation certain more or less characteristic features appear on blood agar plates. The colonies are larger and more moist than the ordinary hemolytic streptococci (*Streptococcus pyogenes*). They are raised and tend to spread on the upper and under surface of the media. A distinct zone of hemolysis is always present which is clear with often a suggestion of a faint greenish tint in transmitted light. This zone is narrower than that produced by the ordinary *Streptococcus hemolyticus*. It begins immediately about the colony and its outer margin may be indistinct. All the blood corpuscles in this clear zone have been dissolved. On blood agar slants the growth is abundant, raised and moist and does not present the mucoid appearance of *Streptococcus mucosus*. There is much less tendency for the colonies to remain discrete

than is the case with *Streptococcus hemolyticus*. In broth uniform turbidity is produced. The growth is more abundant in sugar broth especially if in addition a few drops of blood serum are added. Milk is always acidified and usually coagulated. They ferment glucose, lactose, saccharose, dextrin and maltose but not inulin, mannite or raffinose. They are readily killed by heating to 60 C. for thirty minutes. The cocci are only slightly bile soluble and autolyze very slowly in sodium chlorid solution. These latter tests, their failure to ferment inulin and their hemolytic property on blood agar serve to clearly differentiate them from pneumonocci and to place them definitely in the streptococcus group.

The organisms are highly pathogenic for animals, killing guinea-pigs in relatively small doses. They are distinctly more virulent for rabbits. Intravenous injection of the cocci causes a generalized infection with death following in twenty-four to thirty-six hours. If very small doses are given the organisms like hemolytic streptococci, tend to localize in the joints causing a multiple arthritis; also infection of serous cavities generally and local abscesses in the myocardium. In one rabbit a profuse vegetative endocarditis of the aortic valves resulted with early infarction of one of the kidneys and from the vegetation and from the heart's blood the cocci were obtained in both smears and cultures.

I have been able to obtain cultures from eight fatal cases. In five of these eight cases more or less complete post-mortem examinations were made. A brief analysis of some of these fatal cases I think may be instructive.

Case 1. An old lady over 80 years of age. Six members of the household in which she lived were stricken with the disease almost simultaneously and with almost identical symptoms. The tonsils were primarily and chiefly affected. They were red and largely covered with an exudate. Cultures made from the tonsillar surfaces of two cases in this household group gave practically pure streptococcus. The patient was quickly overwhelmed by the infection and died in about forty-eight hours after the onset apparently from bronchopneumonia. No autopsy. Case 2 was a private patient of Dr. Belnap at St. Joseph's Hospital. The patient was a child aged 3½ years and is the youngest fatal case of this type that I have had an opportunity to examine bacteriologically. The trouble began with a cold or coryza without a positive history of angina. Some days later the child developed fever, rapid pulse and signs of meningeal irritation. Later there was retraction of the head, hypersensitiveness, and soon all the signs of a severe cerebrospinal meningitis appeared. The leukocytes ranged from 20,400 to 44,600 with a relatively high polynucleosis. Spinal puncture was made and abundant turbid fluid obtained containing many leukocytes and much fibrin and myriads of Gram positive, encapsulated streptococci chiefly in pairs. They agreed in every way with the streptococci obtained from other cases. A blood culture made several days before the spinal puncture gave a pure growth of the same coccus. Evidently, therefore, this was a case of septicemia followed by meningeal involvement. Cases 3 and 4 were cases of strepto-

coccus septicemia with positive blood cultures. Cases 5, 6, 7 and 8 were examined post mortem. They all gave histories of colds or sore throats. In all there was acute serofibrinous peritonitis in the exudate of which the streptococcus was obtained pure. Careful search in the abdomen failed to reveal any focus of infection such as an infected appendix, gall-bladder, Fallopian tubes, etc. These cases would therefore pass for what is commonly called idiopathic peritonitis or primary streptococcal peritonitis. In three there was acute fibrinous pleurisy and in one an acute fibrinous pericarditis. In the exudates in all these cases and in the heart's blood in three the streptococci were obtained pure. The atrium of infection in these cases was clearly the tonsils or the throat. In two there was an opportunity to examine the tonsils post mortem. In one the lower crypts of the right tonsil were filled with a tenacious fibrinous exudate from which both smears and cultures revealed the streptococcus growing almost pure. On microscopic section of the tonsil the crypts were seen filled with fibrin and pus cells. There was necrosis in the follicles and in the veins were distinct thrombi extending even out beyond the capsule into the large vessels. In the other case also the tonsils were somewhat enlarged and red and the crypts contained many pus cells. One of the fatal cases was instructive from a surgical standpoint. The patient was a boy aged 14 years in the care of Drs. Elliot and Watkins at St. Luke's Hospital. Beginning as a cold the disease took on the form of a severe infection with symptoms suggesting acute appendicitis, the pain being quite definitely localized on the right side of the abdomen. A laparotomy was made and a normal appendix was found; but the peritoneum was everywhere very hyperemic. Two days later death occurred and at autopsy in the abdomen was found an abundant fibrinous exudate. On the right side between the liver and the diaphragm there was a uniform layer of fibrin and the diaphragm itself was riddled with small hemorrhages. In the right pleural cavity the diaphragm was likewise covered by a similar fibrinous exudate delicately uniting it with the lung. The exudate involved only the lower part of this pleural cavity and the opposite pleural cavity was entirely free. This right pleurisy and involvement of the diaphragm undoubtedly explained the localization of the pain in the right abdomen leading to the diagnosis of possible appendicitis.

Epidemics of sore throat similar to this one have occurred, it would seem, not infrequently. Epidemics in England of what have been commonly called septic or malignant sore throat are not unusual. The epidemic that appeared in Boston about a year ago and which seems to have been traced to the Deerfoot Dairy is of very great interest in this connection. It is especially so in view of the fact that Capps and Miller, as published last week in *The Journal A. M. A.*,[1] find that a very large percentage of cases in Chicago selected at random used milk from a common source. The Boston epidemic clinically was practically identical with the Chicago epidemic, being characterized by the occurrence of glandular enlargement, peritonitis, empyema, arthritis, erysipelas, septicemia, etc. The cause of the Boston epidemic was given as a strepto-

1. Jour. A. M. A., April 13, 1912, lviii, 1111.

coccus but so far as I am aware a detailed study of the organism has not been made. Fortunately some strains of the streptococci have been preserved and a few days ago I received from Dr. Fabyan of Harvard Medical School four strains of streptococci isolated from cases during the epidemic. I have not yet had time to make all of the necessary observations, but from the tests that so far have been made the cocci appear to be identical with the Chicago organisms.

I note from a recent editorial in the *Boston Medical and Surgical Journal* they are again having in Boston a similar epidemic this season though much less severe. Epidemics of a similar character are also reported from Baltimore and Cleveland. Of interest is the report of the epidemic in Baltimore by Hamburger in last week's issue of *The Journal A. M. A.*[2] He states that it is obviously the same clinical disease as that which prevailed here in Chicago and caused by the same peculiar streptococcus. Evidently from the data given it agrees in all essential respects with the findings in connection with our epidemic here.

As was the case in Chicago, at Baltimore and at Boston the milk-supply is suspected as being the distributing agent or at least as playing an important rôle in this respect. It should be stated that without doubt these throat infections may be transferred directly from person to person, by means of droplet infection and through intimate contact in one way or another. The possibility, however, that milk may be a distributing medium and perhaps may so completely overshadow all other methods of transmission I believe cannot be doubted. Milk is such an excellent culture medium for the streptococcus and the danger of contamination by a carrier or an individual suffering from an acute infection is so easily possible that one wonders why we do not have more of such milk epidemics.

The question of milk-supply deserves especial attention on account of the spread by this means of so many infectious diseases — typhoid, scarlet fever, tuberculosis, etc. — now proved beyond a doubt. It surely seems that scrupulous care will not avoid such disasters especially in view of the Boston epidemic in which case apparently every possible safeguard was thrown about the Deerfoot Dairy milk-supply and it was generally considered to be the very best. It would seem that sooner or later we will be driven to look on milk as a dangerous raw food which in reality it is, and treat it as we do other raw foods, that is, cook it or pasteurize it. The situation is not going to improve; it is almost certain to become worse. Milk is being carried greater distances to cities every year which means more time for transmission and hence more bacterial development. It is passing through more and more hands as it is distributed and this means greater opportunity for contamination by disease-producing germs.

Of interest is the recent report of Müller and Seligmann,[3] who investigated an epidemic in children in Germany which is referred to as a grip epidemic and in which occurred a variety of severe complications, including peritonitis, empyema, pericarditis, bronchopneumonia, menin-

2. Jour. Am. Med. Assn., April 13, 1912, lviii, 1109.
3. Berl. klin. Wchnschr., 1911, xlviii, 1636.

gitis, septicemia, etc. They find as the cause a streptococcus which they call the "grip" streptococcus and which they claim is different from the ordinary streptococcus. It is somewhat difficult to judge from their description but, in many respects at least, their organism seems to be very similar to the Chicago streptococcus and I am inclined to believe it identical. Though they refer to the epidemic as grip they did not find in any case influenza bacilli. It might be pointed out here that many if not all of our so-called grip or influenza epidemics occurring at least in recent years are not caused by the influenza bacillus but appear to be caused by pyogenic cocci, chiefly streptococci.

A word might be said concerning the relationship of various streptococci. For practical purposes at least we are coming more and more to use the appearance of the growth of streptococci on blood agar plates as a ready and easy means of identification and also of classification. Pathogenic organisms of the streptopneumococcus group may be divided into four divisions, namely, *Streptococcus hemolyticus (S. pyogenes), Streptococcus mucosus, Streptococcus pneumoniæ* (pneumococcus) and *Streptococcus viridans.* The streptococcus with which we are here dealing would seem to occupy a place between the *Streptococcus hemolyticus* and the *Streptococcus mucosus.* It has some properties common to both of these organisms but on the whole it seems to be more closely related to the *Streptococcus hemolyticus.* Furthermore, some of the strains tend to revert to organisms quite like the *Streptococcus hemolyticus.* On the other hand, so far as we have had time to observe these organisms (several months) certain strains seem to retain their peculiarities with remarkable constancy, and it may very well be that they have acquired characteristics which are sufficiently stable to justify calling them a new variety. The phenomenon of mutation has now been observed in a number of bacteria and when we consider the manner in which bacteria develop, the rapidity of multiplication, etc., we wonder that it is as rare as it seems to be.

SEPTIC INFECTION OF THE THROAT*

MARK T. GOLDSTINE, M.D.

CHICAGO

My attention was first attracted to this strange affection of the throat in the latter part of December, 1911, when a series of four cases in one family came under observation. The slow development of the disease, the differential diagnosis, the chronic course of the illness, the effect on the patient, the seemingly contagious nature of the disease presented a perplexing problem. As stated before, the disease develops slowly, taking from seven to fourteen days before the patient is really ill enough to be confined to bed or the house. The onset is marked by a languid, somewhat exhausted feeling with more or less gastric disturbance, sometimes a few aches or pains here and there, some stiffness of the neck

* Read at the meeting of the Chicago Laryngological and Otological Society, April 16, 1912.

may be present, loss of appetite, very little sore throat. The temperature is not very high: between 99.6 and 102. Pulse is usually more rapid than we would expect from a temperature so low. Pulse runs from 100 to 130.

Physical examination is negative excepting the neck, which on examination early shows glandular enlargement on both sides and more marked on one side than the other. The glands are enlarged, very tender, not red, and the largest ones high up in the neck. On examining the throat we observe a very marked congestion involving the whole throat and extending well up in the mouth. The throat looks like a very sore throat, but still patients can swallow and talk, etc., with a great deal of comfort. The throat and symptoms are not in any proportion. As the case develops the glandular enlargement becomes very marked on both sides and the throat very markedly congested, presenting a deep bluish-red appearance.

The temperature and pulse do not vary, but a rapid pulse remains for some time after the temperature gets to normal and does not slow down until the glandular swelling begins to recede. Headache is present, very severe at first, especially in the occipital region. The disease lasts from three weeks to two months and in exceptional cases longer. The glandular swelling persists for a long time, but the glands do not seem prone to break down and suppurate; in all my cases not one was incised. The cases often come in groups, and sometimes a whole family will get the infection, especially when there is a very severe throat.

Differential diagnosis was not difficult to make, as the appearance of the throat was typical of the disease. One has only to observe a few to distinguish it from other inflammations. The congestion is very marked, has a deep red appearance, is not very moist. The whole throat is affected. Owing to the adenopathy it has been diagnosed as mumps frequently, and at first one may think of scarlet fever; but in a short time they eliminate themselves. Diphtheria, tuberculosis and the rest of the throat diseases can be diagnosed by methods well known to you all.

The prognosis is good except where it complicates some other condition, or where some gland is not up to the normal physiologic resistance. Children recover much more quickly than adults.

My treatment has been very simple, the entire campaign one of building up the patient's physiologic resistance and establishing within the individual an immunity to the infection. Plenty of fresh air and sunshine, and nourishing and easily digested foods were given plentifully, with a large amount of fluids, at least 2 quarts of fluid and more, if the patient would take it. Daily bowel movements, warm baths, ice cap to head if temperature was marked. Medicine for pain or sleeplessness if required. Urotropin was given in 5 to 10 grain doses three or four times daily. For the throat solveol was used as a spray or gargle very frequently. One dram in a pint of water was sufficient strength; it seems to do the work splendidly and is inexpensive. It removed the ulcers in the throat quickly when they were present. Nothing was done for the glands in the way of applications or ointments. Diphtheria antitoxin was given in four cases where it seemed indicated before a throat culture

could be made, but it had no effect whatever. Particular attention was paid to the nose, seeing that no mucus accumulated by frequently dropping into each nostril albolene oil containing a little adrenalin inhalant.

Forty-four cases have come under observation, forty of which were considered typical of the disease from the clinical picture. Four of the cases developed peritonsillar abscess and following their drainage the clinical picture did not show typical of the disease, as the convalescence was very short and the adenopathy subsided too rapidly.

Two patients were pregnant four and six months, respectively; both developed a severe mastitis, the breasts enlarging, becoming hard, indurated and lumpy, and very tender to the touch. When the induration was near the surface the skin was more or less adherent to the mass. They did not suppurate; both cleared up nicely, one taking five weeks and the other two months until the breasts were normal again. One patient, eight weeks after delivery, developed a severe throat which in ten days' time involved one breast markedly and the other slightly. The worst one was incised in two places but no pus obtained. The milk secreted finely and has kept up. The breasts were well in about six weeks. One patient had a severe throat, complicating an acute attack of appendicitis where the appendix had been showing trouble for a long time. The appendix demanded attention, and at operation an acute appendix was removed. There was no evidence of peritonitis at time of operation, but the patient developed a severe peritonitis which nearly cost him his life. Fortunately, after a long convalescence he got well.

One patient had a severe synovitis when his knee was immobilized in a plaster cast for flat-foot; he was convalescing from a severe throat with marked glandular involvement.

There were three deaths:

1. An uncomplicated case with a very severe throat and marked glandular enlargement. The glands were enlarged for three weeks previously to seeing patient; she was very septic; I saw her only once but tried to follow up the case and learned that she died in ten days after my visit from what appeared to be an involvement of the meninges.

2. An obstetrical case normal in every respect which developed a fairly severe throat and in which the blood findings indicated strongly an infection which was not diagnosed positively as a pneumococcus. The pelvic organs could positively be excluded in this case as having anything to do with the sepsis. The patient died on the ninth day following delivery. There was no peritonitis. Post-mortem could not be obtained.

3. An Italian boy 8 years old who had a severe throat with tonsils covered with white patches which cleared up quickly under treatment, but the throat remained red and congested. The glands on both sides were very large. He was given 5,000 diphtheria antitoxin the first day. Three weeks after the beginning of the attacks he was taken severely ill with pain in the chest, rise of temperature, very rapid pulse, etc. He developed a malignant endocarditis and died eleven weeks after the throat developed. Kidneys and other organs were negative. Blood findings were negative.

A SYMPOSIUM ON THE CLINICAL MANIFESTATIONS OF AN EPIDEMIC OF SORE THROAT OBSERVED DURING THE PAST WINTER

1. The Chicago Epidemic of Septic Sore Throat with Especial Reference to Its Pathology and Bacteriology. David J. Davis, M.D.*

2. Dr. Frank X. Walls Discussed the Epidemic as Found Among Children

DISCUSSION

Dr. Walls said that the onset in children was sudden, but without convulsions. In epidemics reported in other cities convulsions had been noted as common, but in over fifty cases that he had seen there was no such onset. In the cases he had observed the temperature had been very high—an average of 103 F., and with a good deal of prostration. The children looked very sick, so that, as a rule, a physician was called early. In addition to the symptoms mentioned in the throat, one saw a very intense injection, with later distinct exudate covering both tonsils. Dr. Walls never saw the exudate extend beyond the tonsils. After a few days the cases usually improved and then, a day or two later, there were complications likely to develop.

The more common complications were enlargement of the cervical lymph glands, usually on both sides (in none of the cases seen by him did these glands suppurate); in two cases there was a very definite inflation of the tissues around about the tonsils, extending into the neck, very much resembling a phlegmonous inflammation, and abscess formation was feared, but they subsided. The ears were often affected. Most of them had some redness or injection, and perhaps in twelve or more of them there was suppuration of the middle ear, where the ears ruptured spontaneously, or it was thought advisable to open them, and a purulent discharge ensued. In one case it was necessary to perform an operation for mastoid abscess. In none of the cases was there any pulmonary complication. Peritonitis was present in two cases. Two cases had suppurative arthritis. In none of the cases were there any renal complications except two cases in which hematuria was present. In those it was thought this was due to the urotropin that the patients had had. There were two cases in which, with the onset of temperature, a rash developed like a scarlet fever. He saw two cases where the children—babies—developed erysipelas without any history of sore throats, but these were children who lived in families where the sore throat prevailed. Dr. Walls then cited some cases that had been observed by him.

Rgarding what Dr. Davis had said with reference to the milk supply being the carrier of the infection, he felt very much like affirming everything Dr. Davis had said.

3. Septic Infection of the Throat. Mark T. Goldstine, M.D.

4. What the Oto-Laryngologist Has Found (Astract). G. P. Head, M.D.

Acute cases of tonsillitis are not often seen by the laryngologist except when complications arise. Of those seen the past winter the average was about the same as in previous years. Every year cases range in severity from those in which there is no fever, merely a few white spots on the tonsils and some soreness in the neck, to those in which the patient is prostrated with high fever, severe generalized aching and extremely sore throat, all symptoms indicating a severe general infection. These patients usually reach the laryngologist on account of complications which fail to subside in the usual time.

Persistent cervical adenitis usually brings the patient in for advice as to removal of tonsils. Peritonsillar abscess often and retropharyngeal abscess generally, are seen in consultation. In regard to these and also accessory cavity affections and middle ear and mastoid complications, I am sure that in my own work the cases have been fewer than in some previous winters.

---

* From the Laboratory of St. Luke's Hospital, Chicago.

A few cases seen in routine office work, in which the patient stated that his physician had said his sore throat was of the new severe variety, showed nothing different as to appearance of throat and nose from the average convalescent from tonsillitis.

I have been impressed by the fact that my ordinary operative work in chronic conditions of the nose and throat has been less interfered with by acute inflammations during the past four months than in average winters.

GENERAL DISCUSSION ON SYMPOSIUM

Dr. Charles M. Robertson was glad to hear Dr. Davis say that the pathologist had found the streptococcus, which was either a streptococcus hemolyticus or streptococcus mucosus, as that corresponded with the findings of the cases he had had. He had called it the hybrid streptococcus, which is not a peculiar streptococcus but is a streptococcus that belongs either in the hemolytic or mucosa group. In some of the cases he had seen the streptococcus at first seemed to be a typical streptococcus mucosus, but with the same smear you would get a streptococcus that looked like a pneumococcus, which was probably a cross between the hemolytic and the mucosa. To the speaker, the most interesting part of this epidemic, from the viewpoint of the laryngologist, was the fact that there were so many phlegmons in the throat and neck. Nearly all the cases he had seen—which were not very many—started with a follicular tonsillitis, which was rapidly succeeded by a quinsy. The quinsy did not seem to produce as much infection of the lymphatics as usual but rather a cellulitis in the tissues surrounding. In several cases the infiltration was almost like a Ludwig's angina. In at least four or five cases there was edema of the glottis, and in one case there was edema of the epiglottis followed by edema of the glottis. While treating one case he carried a tracheotomy tube with him for two weeks, expecting to be called at any time to do a tracheotomy. This man had an edema of the glottis, which passed off, and finally he had a phlegmon in his throat which extended from the clavicle to the mastoid process and from the sterno-cleido to the median line in the neck. This extensive phlegmon did not go on to suppuration, nor did he see any case that did go on to suppuration, although in the clinic he heard of very many cases of adenitis that broke down into suppurative glands. He saw one case that started as a follicular tonsillitis, which rapidly became a general sepsis. The man died from an infection of his kidney, pouring out almost solid albumin, with an infarction in the lung. Another case he saw lasted for three or four weeks. There was excessive exhaustion after the attack, and the young lady had very large and nasty tonsils, which he advised having removed. After the patient got better she consulted him regarding operation on the tonsils. He advised against operating on it for at least two or three months because she had had a streptococcus infection. This case lived away from the city and after she returned home some laryngologist in her home city operated upon her, and immediately there was the greatest amount of suppuration in her neck, both inside and out, so that she was obliged to remain in the hospital for four or five weeks and almost died. In this case it was necessary to have her neck operated upon twice for suppuration resulting after the tonsil operation.

Dr. J. Holinger thought Dr. Head was right in his observation that the cases of pharyngitis and naso-pharyngitis were not more numerous now than in ordinary winters. Neither were their symptoms or clinical course in any way peculiar. We know, from clinical observation, as well as from private practice, that in laryngologic work there is a certain time of the year when all of us are more often called upon to attend ear, nose and throat cases, for one reason or another. In the Eye and Ear Infirmary nearly twenty years ago the difference was very marked. While in summer only twelve, fifteen or twenty patients were seen in a day, in winter and spring there were sixty, ninety and more. He does not think that this present epidemic is in any way different from former ones. Those gentlemen who want to attribute this epidemic to milk infection ought not to overlook this.

A word with regard to treatment: He did not think enough weight was put on the pharyngitis. Many cases were seen with small tonsils—tonsils that were not swollen, that were not inflamed, but the whole mucous membrane of the naso-pharynx was thick, red and highly sensitive. In these cases there is often considerable general infection. Good results are obtained by energetically rubbing the mucous membrane with iodid of potassium solutions. He could not understand the logic of the spray and simple washes in these cases. As long as we know that all these membranes are covered with a scum of tenacious mucus we never will get down to the bottom with sprays. We simply medicate the mucus and never the membrane, while, as a matter of fact, if massage is used, after one or two treatments, very often a pronounced change in the general as well as the local condition is noted.

Another point in the treatment is the general infection. It can be reached with the well known salicylates. He had not heard this treatment referred to. Aspirin had done very good service in a number of his cases, either combined with local applications or alone. Not enough consideration is given to these medicaments which are in our hands to be used in those cases.

Dr. H. Kahn agreed with Dr. Robertson regarding laryngeal infections in the epidemic of the winter months. He had had quite a number of cases—he thought four—of edema of the glottis, and in one case in particular it was quite interesting. A servant girl in a family developed a follicular tonsillitis, or streptococcus tonsillitis, from which she recovered, and in the course of a week developed a dysphagia. She was absolutely unable to swallow even semi-solids. Inspection of the larynx showed a very large epiglottis, thick and red. The patient was sent to Michael Reese Hospital, where he made an incision in the epiglottis and evacuated a large amount of pus. The bowels were opened and an ice pack put over the larynx. She could swallow quite easily in a few days and by the end of a week was entirely well. In this epidemic there have been very many more laryngeal complications than in the ordinary sore throats as seen in other years.

Dr. Kahn asked Dr. Davis as to the mode of inoculation of the tonsil from the milk, and if he thought it possible that the ordinary streptococcus found in the tonsil could become more virulent under some conditions which prevailed this winter, so as to cause these particular sore throats seen this year.

Dr. J. R. Fletcher said he had been so situated as to observe this epidemic from the standpoint of the general practitioner as well as the specialist. He had seen perhaps forty or fifty of these cases, and was sure he could confirm what had been said by Dr. Walls and Dr. Goldstine.

Dr. Davis had said the onset was quick; Dr. Walls confirmed this; Dr. Goldstine said it was slow. His experience had been that they were all the same type of disease, but that in the severer cases the onset was quick, and in the milder cases it was slow. He had seen quite a number of cases in which the disease primarily attacked the tonsil; in others it attacked the nasal mucous membrane. He had seen two cases which involved the ears without involving the tonsils, and also cases in which the nasal mucous membrane had been perfectly free and in which the disease primarily attacked the tonsils, and secondarily the ears and the mastoid. Among his own relations, one entire family of six children, father and mother, and girl, and his wife, all had trouble except three children who last year had their tonsils removed. These children escaped with the exception of one little girl who had a mild attack. There were two children in that household who had convulsions. The mother of this family had a tonsillitis of this peculiar type, with all of the systemic symptoms described, but one tonsil, the right, especially was so large that it completely filled the throat. The left one was not very much swollen. He put a knife deeply into the swollen tonsil but found no pus. He had seen two other cases of the same kind which astonished him. In three cases he made a mistake in diagnosing peritonsillar abscess.

He had been called to see another case, that of a girl who had been suffering from this trouble for six weeks. He was called because she had suddenly grown very much worse. She had also one tonsil very much enlarged. The glands on

that side of the neck were exceedingly enlarged; on the other side very slightly. The glands on the affected side were almost as big as both of his fists. When he was called to see her she had developed an acute mastoiditis, a paracentesis had been done two days before, and he operated on the mastoid. A great deal of pus was found and removed, but the temperature did not go down. This was the sixth week after onset of the disease. The family physician wanted to open the tonsil on account of the continued enlargement of the glands of the neck, but at his suggestion it was decided not to open it but to remove it, in spite of the fact that there was an immense swelling. He thought that the system was well walled off from the local space and that it would be good surgery to remove the tonsil. The sequel proved that to be so. The night after removal of the tonsil her temperature dropped from 104.5 F. to normal and had not risen since.

Dr. Fletcher also cited the case of a man who had the onset with severe tonsillar trouble, with empyema of the maxillary sinus; the infection spread to the ears. He then had a pericarditis and endocarditis; then a joint infection. His kidneys were not involved. The man had been at the point of death for some time and Dr. Fletcher did not know the outcome.

So far as the milk was concerned he thought that was an important point. In the suburb in which he lives the milk came from different sources.

Regarding treatment: he thought that in some cases, when seen early, the administration of aspirin was good. He had used it in some cases with highly satisfactory results. In some cases he has used an application of ten drops of carbolic acid, two drams of oil of eucalyptus, seven grams of glycerin. He found that if this was used very early and energetically the cases have gotten well in a day or two. It had seemed to abort the attack if well rubbed into the tonsils and over the pharynx. In a day or two the beginning tubal inflammation had been stopped.

Dr. H. W. Loeb, of St. Louis, had had a limited experience with the Chicago epidemic. He thought he saw the case referred to by Dr. Robertson in consultation, however. It was a very large gland that was evidently giving trouble. The patient's temperature rose to 102.5 F., and at his suggestion the gland was removed. A relatively small amount of pus was found in the central portion of the enlarged gland.

The epidemic in St. Louis this year was by no means so severe as in Chicago. It seemed to run in waves. For instance there would be a lot of cases of mild sinusitis, which would soon recover. Then, a few weeks later, the sinusitis was of a more severe type, very much less prevalent. Then a few weeks later the ears would become infected. But anything like the severe epidemic that was found in Chicago and other cities had not been seen in St. Louis.

He was very much interested in the subject. Two points had struck him particularly: 1. The chronicity of the acute infection, if he might put it that way; namely, the acute tonsillitis, lasting so much longer than similar tonsillitis attacks had lasted before; 2, the fact that not one of these particular cases ever had any marked tonsillitis develop, but they were cases in which the tonsils had given relatively no trouble. He thought that they had become so affected by the continuance of the inflammation that they were unable to resist the onslaught of the bacteria.

One of the most interesting cases he had of this sort was last year, in which there was an acute general septicemia resulting from an acute tonsillitis, which had lasted for three or four weeks, and which was of a mild character, in a girl who never before had had tonsillitis, or even an acute inflammation of the nose. It became necessary in that case to remove the tonsils and adenoids during the attack. The temperature would rise to 105 F., with a chill, then go down, and then rise again, and so, after consultation it was decided to remove the tonsils and adenoids. The operation was performed and the tonsils were found to be the seat of a growth of streptococcus in pure culture. The adenoids, on the contrary, were found to have staphylococci and no streptococci were observed.

Coincident with this, there was an enlarged posterior cervical gland, which it was necessary to remove, three days after the tonsils and adenoids were removed.

A sac of pus and pure staphylococci were found, which led him to think that this particular affair was the result of adenoid infection and had nothing to do with the tonsil infection, which primarily caused the acute general septicemia.

He called the attention of the Society to the numerous epidemics of acute inflammations of the peritoneum that have occurred in Europe, particularly in small towns, and which have been considered due to the milk supply, especially one that occurred in Helsingfors. He did not remember how many cases were affected, but an unusually large number, of an acute septic variety, following tonsillitis, or coincident with it. The whole subject was one that justified very close attention.

He felt that Dr. Davis had presented a most careful study of the bacterial flora, and he was sure much would come from it.

Dr. Samuel J. Walker said that what had struck him most emphatically was that in a number of cases the patients seemed very little sick in the beginning, but after a few days would show symptoms of profound intoxication, and he had seen numerous cases in which he had thought the disease had practically run its course, which had exacerbations of the symptoms, with pronounced toxemia.

Another point in the discussion which interested him was the advisability of operating on these cases in the acute inflammatory stages; removing a tonsil, for instance, that seemed to be the seat of the original infection, during the acute infection. He had always thought that a tonsil should never be interfered with during acute inflammation. But, on the other hand, it would seem that if the source of infection is in the tonsil and infection constantly emanating from this focus and toxemia persisting, it was logical that such a tonsil should be removed. He had heard only one or two gentlemen refer to this point, but he thought it was interesting and very important.

As far as complications in these cases were concerned, he thought that a mild nephritis was extremely common, and not so very infrequently severe inflammations of the kidneys. He cited the case of a young man, aged about 24 years, who came down with what seemed like a moderate sore throat, but with a great deal of prostration. After three or four days this patient developed an intense hemorrhagic nephritis and was then removed to a hospital—a general hospital, and of course he would not have been admitted to the hospital unless the throat had seemed to be of a benign type of infection. Three or four days later he developed an erysipelas of the face which was intense; several days later meningeal symptoms developed, and he died comatose. The whole process, without question, was a streptococcus infection.

Dr. Walker was sorry not to have heard Dr. Davis' talk on the bacteriology of the disease. The whole subject was extremely interesting, on account of the great intensity of this infection this last winter, and he thought there was a great deal left to learn about it.

He wished to say, however, that, in his opinion a great many conditions had been erroneously called streptococcus infections in the sense that they belonged to the same type of infections under discussion. All physicians know that ordinary follicular tonsillitis is, in the vast majority of cases, a streptococcus or staphylococcus infection—in the majority of cases a streptococcus infection—and is accompanied by much prostration. He gathered from what he had seen in the literature recently about this *new* form of epidemic, that the organism causing this particular virulent form of the disease was different from the ordinary streptococcus, and asked Dr. Davis if that was the case, to which Dr. Davis replied in the affirmative.

Dr. Harold N. Moyer said that, so far as he was aware, there were no special nervous complications noted in this particular epidemic. The only ones he knew of were those that grew directly from meningeal involvement, due to the extension of the infection to the meninges. He was not positive that this kind of a bacillus ever attacks the parenchyma of nervous tissue proper, and so these cases, if there were any, were really simply those of continuity of infection, and conse-

quently he did not believe that they could be properly spoken of as nervous complications, only in a secondary way.

He had been deeply interested in the problem, and, on going over his experience in the past, it occurred to him that he had never seen anything definite in the way of parenchymatous involvement of the nervous system result from this sort of thing, merely secondary involvements.

Dr. H. W. Cheney said that in the early days of the epidemic, before it was realized that it was something that we had not had before, it was often confusing to see the enlargement of the cervical glands and many of the cases were diagnosed as mumps. One of the good features of the epidemic, he thought, if there could be any good features, was that in the majority of cases the cervical glands did not suppurate. Those that did were the exception. He had only two that suppurated and had to be incised. One of these was unfortunately in his own boy. And this brought up the question of the milk supply. On inquiry, he found that he had been taking milk from the suspected dairy, so that possibly the two cases in his family had come from that source.

One of the severest cases he had seen was in a baby. The mother first had tonsillitis. The baby took it from her, and then developed an otitis, after that an erysipelas which spread over the entire face and head. The child was exceedingly sick, with symptoms almost resembling meningitis part of the time, but fortunately recovered.

Dr. Norval H. Pierce's impression was that there had been an epidemic that possessed marked characteristics locally and generally, aside from the ordinary follicular tonsillitis and accessory sinus disease, which is normally prevalent at this time of the year. Locally, the cases that he had seen had impressed him with a rather slight hyperemia and slight swelling of the mucosa of the pharynx. He believed that the source of infection had been the tonsil, but the tonsils had not exhibited the ordinary symptoms of an acute follicular tonsillitis. The crypts did not contain the tough, solid exudate that is usually seen in ordinary tonsillitis, but the exudate in these cases was soft or quite fluid; in fact, the tonsil had to be everted occasionally to squeeze the fluid substance out of it. It was the color of skimmed milk. This would contain the virulent germs almost invariably. The pharynx, on the other hand, would be diffusely red and slightly swollen, and this might extend up into the post-nasal space and down into the larynx, or down into the vestibule of the larynx and around the arytenoid bodies. Altogether, this was a peculiar appearance.

Another point was the marked systemic involvement. Accompanying these comparatively slight pharyngeal symptoms were found enormous glandular involvements, which would come on very suddenly, over night, so that the neck would be swollen out on a level with the maxilla, and would then disappear almost as rapidly. He had seen a mastoid abscess develop following this disease, with marked destruction of the mastoid, with very slight external symptoms, pain and swelling, or redness. He had also seen marked nephritic complications, granular casts, the presence of albumin and blood, accompanied by marked general prostration, a slow pulse, with a very low leukocyte count. This picture of disease he believed to be peculiar to this present epidemic. While he thought that the vast majority of the sore throats had been the ordinary sore throats that are seen every winter, he still believed that there had been a type of pharyngitis that had been peculiar.

Regarding the removal of tonsils during acute inflammation: theoretically, it would appear that this was the right thing to do. It would be taking away the source of infection. But, practically, he had known cases where this had been done where the most disastrous results had followed. He could recall cases where patients had been operated on during or very shortly after an acute attack—say within a week—and the cervical glands had immediately become invaded or suppurated and broken down, so that the patients have been sick for weeks. He remembered one case where the tonsils were operated on together with the adenoids, shortly after a severe acute tonsillitis, in which a phlegmon developed

in the throat, which resulted in death. He did not think it was a wise thing to do. It is much safer to disinfect the tonsils by means of nitrate of silver on a bent probe and carried down to the crypts during and for at least two weeks after an acute attack, than to operate. He knew of one case, in Vienna, in 1890, where a man had fever for several weeks, and a tonsil was somewhat swollen. The professor, in whose clinic the case was seen, thought it simply a parenchymatous swelling and removed the tonsil with the guillotine, and at the base of the tonsil there was found quite a large abscess. The man recovered nicely, without any trouble, and the fever, malaise, etc., disappeared. However, Dr. Pierce thought this was an entirely different proposition. He would much more readily operate on a case of abscess of the tonsil, or even a peritonsillar abscess, by taking out the tonsil, than he would a tonsil that was honeycombed with these germs, where the crypts of the tonsil were the abiding place of germs in an acute stage of virulence, because when such a tonsil is taken out we open up innumerable lymphatics, innumerable channels for further extension, and, in the other case, the inflammation has probably become walled off, the lymphatics perhaps sealed up, so that there was not so much danger of extension.

Dr. Joseph C. Beck said there was one condition that he had observed during the late epidemic that had not been touched upon. He agreed with Dr. Pierce, regarding the appearance of the throat, in every particular. He was impressed by the same condition and the milky-looking deposit on the tonsils. He had never had, personally, an attack of tonsillitis until this season, but this was a very severe one of the type described. There were seven in his household, and they all had it.

There was one complication which he noticed, namely, a very marked glossitis. He had seen one case which terminated fatally, in a child aged 4 years, who had this acute simple tonsillitis, with deposit on the tonsils, who within forty-eight hours developed glossitis, so that the mouth was filled with this large tongue. Fortunately, he had removed the adenoids in this case about a year before and the child could breathe through the nose. The tonsils were not very large, but the mouth was filled with the tongue. This infection spread from the mouth, as we see in cases of Ludwig's angina, the general infection spreading along the neck, down to the naval, with no distinct line of demarcation, acting like an erysipelas. After six days the child died, apparently from prostration.

He had also seen a case with intracranial complications in which this condition existed in the throat, and four weeks later a mastoid developed. A simple mastoid operation had been done, and when Dr. Beck saw the case there was a paralysis on one side of the abducens and he thought of the possibility of an abscess. There were other meningeal symptoms. Spinal puncture showed a pure culture of the streptococcus described by Dr. Davis. This case lasted about ten days after operation, and died, evidently from a general septic meningitis.

Dr. Wm. L. Ballenger wanted to bring out one or two points that he had not heard mentioned by any of the speakers. In one case he was called late at night —a mastoid case, in a gentleman about 54 years of age. He had had a tonsillitis of the type under discussion about ten days previous to this time and had gotten apparently well of this. He then was stricken with mastoiditis, which developed very rapidly, and when seen by Dr. Ballenger he had a beginning meningitis. He did a mastoid operation upon him but the meningitis proceeded, as it had been expected it would, and in a few days the patient died of meningitis. The next morning Dr. Ballenger operated on a child, aged 11 years, who had had a tonsillitis a short time before, later developing a mastoiditis and sinus thrombosis. She had been having the low temperature of the morning, followed in the afternoon with a hard chill for five days. He did a mastoid operation and opened the sinus and jugular bulb. The temperature continued with the typical curve for one month. About ten days ago she ceased to have these variations in temperature

and now is well and up. This case was very persistent, as perhaps is significant of the fact pointed out by Dr. Loeb, that this infection is a very persistent one.

One other case he wished to speak of—that of a little girl, because she developed a sinus thrombosis, which had been mentioned as one of the complications. He spoke of this case because of the meningitis which developed, and which was speedily fatal.

Dr. Ballenger had had several other cases during the winter that probably would belong to this same class, but none of them of any particular interest.

One other fact he referred to, in connection with what Dr. Head had said, namely, that he had not observed in his own practice very many more cases of tonsillitis or nasal disease this winter than he had in ordinary winters. There were some ways of explaining that, the speaker thought. He had observed that when we had the epidemic of la grippe some years ago, during that winter he did not see so very many cases in proportion to the disease prevalent at that time, but he attributed that to the fact that in a large city like this, distributed over a large area, that specialists do not see so many of the acute cases as in smaller cities where they are in closer relation with the family physicians.

Dr. Head (closing the discussion on his part) said there were one or two points in regard to treatment that had not been spoken of. It was his experience that in a case of tonsillitis, instead of the ordinary salicylates, which perhaps will relieve the pain, salol had been the one thing that he had relied on after trying various other things for a good many years. In salol he felt that we get the salicylate which is the same as that in the aspirin, and we also get an appreciable quantity of carbolic acid in the shape the blood can tolerate. He always felt it was peculiarly indicated in a disease like tonsillitis, which is accompanied by such severe symptoms.

In the matter of the spray, he thought that a well directed spray on the tonsil would accomplish good results. In a number of cases which he had seen with tonsillar involvement, the temperature running high, he had found that a spray, well directed, would cause the temperature to drop to normal within a few hours, showing what the cleansing could do there. It helped Nature to get rid of the infectious material, and cleaned out the crypts to some extent.

In regard to removing the tonsils during an acute attack, his experience had been similar to that expressed by Dr. Pierce. It seemed ordinarily a dangerous thing to take out an acutely inflamed tonsil. He remembered a case seen last summer in which the patient had a temperature (the patient was a small child, 4 or 5 years of age) running up to 100 F. practically every day for some weeks. The family physician brought the child to Dr. Head with regard to removing the tonsils, which were inflamed. They waited and sent the child to the country for several weeks. The temperature still went up every day, but there were no evidences of involvement of any other organs. He removed the tonsils then and the fever subsided immediately and the child had had perfect health since. So that in a case of that kind one would be justified in removing the tonsils.

Dr. Goldstine (closing the discussion on his part) said that regarding the administration of aspirin in these cases, he had very seldom been called to see these patients before a thorough course of aspirin had been taken. The use of aspirin now is more common than that of castor oil. It did not seem to have any effect on the cases in his practice. Urotropin seemed to be the best thing. He thought the general building up of the patient's resistance to the infection did more to help than any specific remedy.

Where the question of removing the tonsils came up he felt about it just as he felt about his own work, that he would not remove the uterus when he thought the infection had gone beyond it. He thought in these cases the infection was beyond the tonsil before the case was seen. He never used any strong applications in the throat because he was afraid of them, as he thought that strong applications reduced the resistance of normal cells.

Dr. Davis (closing), with reference to the question of operating in the acute conditions, thought something might be said from the pathologic side. In the laboratory they did not get very many tonsils in the acute stage of infection for examination. Men, generally speaking, were opposed to removing tonsils at that time, and so they had to rely on post-mortem material. He was able to get a couple of tonsils from cases and in the examination of these the crypts were teeming with these streptococci. There was a rich exudate there, consisting of pus cells and fibrin, but the infection evidently had traveled through the epithelium, the epithelium itself being permeated with leukocytes. There were areas of necrosis in the lymphoid tissue underneath the epithelium, and in the small blood-vessels, and even in the larger veins there were distinct thrombi, septic thrombi. Of course, theoretically, if one could remove all that material, it might be a rational thing to do, but it would be a very difficult thing to do and the probability is that if one operated at that time these organisms would be scattered about the lymph spaces, the blood-vessels would be opened, and the chances are that the condition, so far as a generalized infection is concerned, would be very much more favorable than before operation. He would advise, from a patho logic point of view, distinctly against interference during the acute stage.

He wished to call attention again to the fact that not in all of these cases of acute tonsillitis was this kind of streptococcus found; in some, the ordinary hemolytic streptococcus occurred. However, in all of the fatal cases and in practically all cases complicated by empyema, septicemia, etc., this particular type of streptococcus was found.

With reference to the milk supply, he thought one should be cautious in drawing conclusions; however, the facts must be carefully considered. In the case of the Boston epidemic, for example, which was studied very carefully from this point of view, it seemed to be the unanimous opinion that it was due to the milk supply. Seventy-five per cent., or thereabouts, of the cases were provided from one milk supply. Now word comes from Baltimore, that practically all of the infected cases there received one particular milk supply. As we have seen from the studies of Drs. Capps and Miller, here in Chicago, a very large proportion of the cases obtained milk from a common source, and it appears that as this matter is studied more carefully and detailed facts obtained, the evidence is accumulating in favor of this theory. It should be kept in mind that milk is an excellent medium for the growth of this organism. It is also known that milk can carry typhoid, scarlet fever and other infections, and there is every reason to think first of the milk supply as being the carrier of this infection.

Regarding the question as to the way in which the tonsils are infected from the milk, of course the organisms pass over the tonsils and they may then pass directly into the crypts. We should remember that the crypts of the tonsils are a most excellent breeding place for streptococci. For some reason they seem to thrive better here than any other organism.

One other point: in the last several weeks in the hospital they had noticed an unusual number of cases of tuberculosis. These were principally tuberculosis of the lymph glands, and pulmonary tuberculosis. He did not know whether or not there was any relation between these cases and the recent epidemic. He had not been able to look carefully into the matter as yet, but it would seem reasonable that the epidemic might have stirred up old tuberculous foci in these individuals, or possibly the streptococcus infection of the lymphatic organs and structures of the respiratory tract, made them susceptible to a subsequent invasion by tuberculosis. We are not unfamiliar with this in connection with other diseases, as, for instance, the not infrequent invasion of the body, following measles, by tuberculosis.

ARTIFICIALLY DEFORMED SKULLS, WITH SPECIAL REFERENCE TO THE TEMPORAL BONE AND ITS TYMPANIC PORTION *

WALTER P. MCGIBBON, M.D.
Instructor in Otology, Northwestern University Medical School
CHICAGO

In the ascending scale of animal life there is probably no group of bones which have had more influence on each other in their progressive changes than those comprising the brain case and the face. Because of their relationships to each other it becomes impossible when one is studying them during their postnatal development to isolate a single bone, and they have to be considered in their entirety. The purpose of this paper, however, is to direct attention to the irregular projections of bone in the external auditory canal found in a majority of those markedly deformed skulls of over 100 skulls examined. Though such projections have been mentioned and briefly described by many anthropologists as exostoses, further considerations would seem to indicate that they are not true exostotic growths, but are an abnormal development, or deformity, of the tympanic bone brought about by the artificial mechanical treatment to which such skulls have been subjected. The consistent deformity — and by that I mean a similar effect produced by a variety of pressures in varying subjects — of this bone indicates also the more far-reaching effect of pressure on the skull on both the brain and the bones of the face.

Historical.—It is interesting to note how far back in antiquity cranial distortion was practiced, evidences being seen earlier than the Iron Age. In fact, it is probably impossible to decide the earliest stage of human progress in which this practice was indulged, as some of the earliest skulls known show evidences of this treatment. Hippocrates first writes on this subject in describing the Macrocephales, a people who lived east of the Palus-Mocotis, from which custom it is said that they derived their name. Topinard says also that Herodotus described the same people and that Aristotle, Strabo and Pliny mention them. The two leading types which we find characterizing deformed skulls, dolichocephalic and brachycephalic — only the latter type is mentioned by writers as having been artificially deformed — have been removed from the round and the long barrows of England, and with them were buried implements contemporaneous with the Iron Age. There are also further indications of many of them belonging to the Neolithic and Bronze periods.

Distribution.—The practice had a wide geographic distribution from Syria on the east, throughout Europe and Africa to America on the west. The Caucasus, Crimea, Hungary, Silesia, Belgium, France, England, both coasts of Africa, many islands on both sides of the world, South America, especially Peru, Mexico, and the United States, in the southwest and the Columbia River regions particularly, have given to the excavator many crania variously misshapen by artificial means. Whatever the cause

* Read before the Chicago Laryngological and Otological Society, March 19, 1912.

or reasons for this interference with Nature's processes, and whatever the disadvantages, it serves and has served a very useful purpose by augmenting historical data in identification of the derivation of peoples and races, and apropos of this consideration it may not be disadvantageous or uninteresting to quote from a man who has studied and written much on this subject. Topinard says: "We conclude, therefore, in comparing these data with those which history furnishes that the Aryan nations with one of their tribes having this custom have passed over the Volskes-Tectosages of the Caucasus under the name of Cimmerii, through Europe into France, where the processes of disfigurement have become modified in the way we have mentioned." [Referring to three pathologic deformities of the skull which he calls posthumous, platybasic and plagiocephalic.] "Other skulls, however, have been met with in Europe as the Helvetio-Burgundian skull of Voiteur in the Jura, in the form of a sugar-loaf; and perhaps that of Bel-Air, near Lausanne, in Switzerland, the nature of whose deformity is different, which leads us to believe that all European peoples disfiguring their heads have not had the same origin. Deformations of the skull have been discovered in Polynesia, especially in Tahiti, in Malacca and in different parts of Asia as far as Syria.

"But the classic country in which these deformations are found is America. From a period prior to the Christian Era, we see a nation, the Nahuas leaving Florida, according to Brasseur de Bourbourg, to settle in Mexico, and quitting it in the year 174 to disperse, some to the north along the Mississippi, others to the south, across the Isthmus of Panama, and there disseminating the custom of flattening the head from behind forwards. Other deformations of a different type are met with in the same country, which it seems reasonable to refer to another primitive people. From these deviations from one and the same custom, we may infer that its origin dates back to a very remote period."

Neither sex escaped in this primitive procedure; an examination of a series of skulls, of both male and female, show the artificial deformities, but the number of female skulls is in the minority and these show less exaggerated molding. This may not be due, however, to the practice being more general on the males, as the male skulls were greater in number in the groups examined.

The types of deformation at once divide themselves into two distinct classes, the long narrow-headed or dolichocephalic, and the short broad-headed or brachycephalic. In the extremes of these two it is not possible to attribute any other cause than artificial mechanical compression, the conception present being to distort the permanent shape of the head to conform to either an idea of hideousness or beauty; or perhaps for the purpose of distinguishment or identification, since families, tribes and nations had different and distinctive head deformities. There are many modifications of these two extreme types; for example, the occiput alone may be flattened, or the flattening may be confined to the frontal region or again the pressure may have been so distributed as to affect mainly the parietals. In many of these modified conditions there arises the ques-

tion as to whether the malformation was accidental; for example, due to the manner of carrying the infant or to its lying on a hard surface as the primitive crib with no soft head rest; or whether these conditions were preconceived and methodically elaborated; or again, whether they may have been due to some pathologic condition. Still another point arises in the consideration and discussion, and that is as to whether or not any degree of these modifications may have been congenitally transmitted. This question has been much discussed and is now answered almost, if not quite entirely, in the negative.

The question as to the earliest origin of this practice involves a consideration of the psychologic state which has induced the popularity of such procedures, a question even more difficult to determine than the time at which this procedure was inaugurated inasmuch as one is here dealing with an intellectual force which is played on by the myths of the past, and which is profoundly affected by the consequent delusions. The aboriginal mind almost defies investigation in regard to the mental state which originally led to this physical deformation. The determination of the reasons for this form of physical distortion must be largely influenced by personal opinion, based on a consideration of the various reasons given for these practices together with a careful analytical survey of the ages of darkness which the primitive mind has traversed. Again the fact must not be lost to sight that this was not the only method of torture or distortion; many other parts of the body were subjected to artificial treatment to produce departures from normal form, but in the majority of these the soft structures mainly were involved and so skeletal indices are wanting. Of these customs, however, we have even so late recorded observation as given by Col. Theodore Roosevelt in his recent publication as follows: "One group of women, nearly nude, had their upper arms so tightly bound with masses of bronze and copper wire that their muscles were completely malformed. So tightly was the wire wrapped round the upper third of the upper arm that it was reduced to about one-half its normal size, and the muscles could only play, and that in a deformed fashion, below this unyielding metal bandage. Why the arms did not mortify it was hard to say, and their freedom of use was so hampered as to make it difficult to understand how men or women whose whole lives are passed in one or another form of manual labor could inflict on themselves such crippling and pointless punishment."

The mental state acting as the forerunner of these procedures, however, is not referred to and it is accepted that it is done for purposes of personal adornment or as features of distinguishment. So also O. W. Barrett in a recent article speaking of the personal decorations of the Mozambique women says: "This scar tattooing is practiced very largely by the M'Chopis, and is imitated to some extent by their neighbors. However, the lower tribes do not usually make so large nor so thick a bosse as the M'Chopi women. The M'Chopi tattooers use one or more native resins to rub into the fresh surface of the cut to stimulate the growth of scar tissue. Consecutive semicircular cuts are preferred. The bosse or point in the center of the scar mass is sometimes one-half an inch thick.

There seems to be little design among the M'Chopi tribe in the arrangement of these scars, which extend from a line just below the breasts to just above the knees."

So late as 1585, in ancient Peru, before the Spanish conquest, an edict of ecclesiastical authorities against head deformation (mentioning three distinct forms) was issued and again a government edict against it was published as late as 1752. Flower, in "Essays on Museums," after discussing the original people of whom so many deformed skulls have been found in Europe, and inclining, with the later French authors, in assigning them to the Aryan race, remarks: "Whether the French habit, scarcely yet extinct, of tightly bandaging the heads of infants, is derived from these people, or is of independent origin, it is impossible to say." Further he says: "But the Chinook Indians of the neighborhood of the Columbia River, and the natives of Vancouver Island, continue it to the present day" (1898). Thus it may be seen that primitive peoples have practiced and do practice varied forms of distortion of various parts of the body even in our own time and the state of mind which induced it is just as far from the understanding of the so-called superior races as it ever was. It is, however, recognized generally that in all stages of development the human family has been and still is strongly subject to influences of superstitions and myths and their actions controlled to a greater or less extent thereby. So whatever reasons it may be possible to add to this general statement it is quite probable that the then conceived religious ideas, at least, were a strong factor in the causation of these practices. And this is shown in the following observation by M. Coragua: "When our children are young, said the chiefs to the Friar Bobadilla, their heads are tender and are then molded into the shape which you see in us by means of two pieces of wood hollowed in the middle. *Our gods instructed our ancestors* that, by so doing, we should have a noble air, and the head be better fitted to bear burdens." In addition to this the reasons for cranial malformation are various; for instance, Torquemada states that in Mexico the Indians used to deform their heads to appear more formidable. Spencer affirms that permission to shape the heads of their children was a favor granted by the Inca to some nobles, the artificial contours being that of the royal family. While the Coragues and Collas of Peru say that they form their heads into these shapes (long and broad, but flattened behind) that they may be more healthy and be able to do more work. And yet another nation follows out this custom to increase the ferocity of their expression. Santa Cruz says: "Maneo Coapac ordered the heads of infants to be pressed that they might grow up foolish and without energy; for he thought that Indians with large round heads being audacious in any enterprise, might also be disobedient."

The method of producing these deformities, of course, varied according to the particular type of skull formation it was desired to obtain. In this consideration those apparently accidental cases which were brought about by the infants being strapped to a board for carriage, or those induced accidentally in other ways may be excluded. As it is only those extreme types of malformation, where force and counterforce have been

employed, that show marked disturbance or deformation of the tympanic bone, so the methods of production of only those types will be here considered.

As above indicated these types are two in number and diametrically opposed in form, except in one very important particular and that is the condition and relations of the lower or basilar part of the skull. In both the brachycephalic and dolichocephalic types, whether extreme or only slightly affected, the basi-cranial relations are similar in their manner and degree of departure from normal. Discussion of these deviations is reserved until later but the fact of the two types being similar in this respect can be shown by an understanding of the methods producing them. This fact on only a cursory thought is contrary to supposition as the one type is the broadest and shortest known skull while the other is the longest and narrowest known skull, these measurements having to do, however, only with the calvarium. A quotation from Landa made by Spencer describing the method of procedure for producing the brachycephalic deformation will give a general idea of the mechanical contrivances in all similar cases: "Four or five days after birth, the child was put on a small bed made of rods, and there, the face being underneath, the head was put between two boards, one being at the occiput and the other at the front. Between these they compressed it forcibly, and kept it there for some days, until the head was flattened and shaped like their own." This was the general way in which this type of deformation was accomplished, but there were, of course, variations in applying this pressure. The point being that the pressure was applied anteriorly over the frontal bone (which in infant life is composed of two bones, the suture extending between them to the nasal bones) and posteriorly over the occiput so that the pressure was exerted anterior and posterior, respectively, on a plane passing from the glabella to the occipital point, this plane approximating the basi-cranium and including the parts of the temporal bone.

The method employed for producing the dolichocephalic or sugar-loaf head was to bandage the cranium from the occipital point around posterior to the auricle over the superior part of the mastoid, to the frontal region and back on the opposite side in a similar manner to the occipital point. This bandage covered the frontal bone from the glabella up over the frontal eminences, where apparently a space was left and then the bandage again applied just posterior to the coronal suture, so that in many skulls, at least, a laterally extending elevation occurs between these two points. It is evident in these cases as in the artificial brachycephalic type that the inferior area receiving pressure approximates the antero-posterior plane of the cranial base, but from the position of these compressions the skull is permitted to expand upward and posterior developing along the lambdoidal and allied sutures. Again this skull differs in form from the artificial brachycephalic as the technic of this procedure limits or compresses the median lateral diameter, therefore resulting in the marked narrowing of the skull. The lateral compression and that over the frontal and infra-occipital regions permit development only from the sagittal and lambdoidal sutures. So that while the manifest external

results of these two types are diametrically opposed it is only the cranial vault or calvarium which is affected in an opposite manner and the cranial basilar structures suffer in each instance in a similar way.

It was the original intention of the writer to describe and demonstrate malformed tympanic bones which occur in many artificially deformed skulls of the brachycephalic type, which were observed while studying other mechanical effects in development. While making additional observations on artificially dolichocephalic skulls, in order to show the supposed opposite or dissimilar conditions in the tympanic bone from those in the brachycephalic skulls it was found that they showed as consistently a similar but less amount of pressure on certain parts of the petro-mastoid, squamo-zygomatic and on the tympanic bones causing in a less pronounced degree similar malformation of the latter bone to that found in the artificial brachycephalic skulls and a marked change in form and development of the petro-mastoid and squamo-zygomatic parts of the temporal bone. The above notation of facts introduces the truism voiced by the distinguished anthropologist, Dr. George A. Dorsey, that "in artificially deformed skulls every part is deformed," rendering it impossible to consider individually in its growth any separate bone of an artificially deformed skull, the same as is true in an unrestrictedly growing skull. It was made necessary, therefore, to include with the malformed tympanic bone changes in form and relations of the other components of the temporal bone found in the two opposite representatives of deformed skulls.

A marked difference is noted in the two types of deformation at the temporal part of the lateral antero-posterior suture. In the brachycephalic skulls there is closer approximation of the suture between the squamo-temporal and the articulating bones than in the normal, the parietals causing a bulging outward of the temporals. In the dolichocephalic skulls on the contrary there is marked widening of the sutures in this locality, in many instances the parietal bones being considerably drawn away from the squamo-temporal and an indenture following along the suture well to the sagittal side of it. Notwithstanding, however, the diametrical differences in shape of these two types of skulls, owing to the fact that the temporal bone unites the anterior and posterior segments of the base of the skull, the methods practiced in producing the deformities involve the temporal bone in a similar manner in both instances, especially affecting its outer end containing the external auditory meatus, formed in the main by the tympanic bone. The effects produced are of the same kind, differing only in degree. The exact location of pressure varied but the external auditory meatus with its tympanic bone being in the direct line of fixation or compression, as a consequence was found to be malformed in both types in a similar manner but less markedly in one than in the other.

Other parts of the temporal bone receiving pressure in a different manner and direction or being allowed freedom and complementary development in other directions, vary according to the differences incidental to the type of compression exerted. These variations between the two types will be noted in the individual reports of the specimens examined which

are appended, but there are some which are sufficiently interesting and possibly instructive in their bearing on the development of the skull as to warrant special consideration.

In all examined skulls artificially shortened, the relations of the squamo-zygomatic bone to the parietal posteriorly and to the ali-sphenoid anteriorly are changed, the sutures being much more closely approximated and the antero-posterior axis of the squamo-zygomatic relatively shortened. The foramina between the petro-temporal and articulating bones are strongly contracted and this fact together with the almost total obliteration of the sutural crevices between the petrous bone and the basi-occipital posteriorly and the basi-occipital, basi- and ali-sphenoid anteriorly give the petro-temporal the appearance of having been driven like a wedge into an almost solid structure. In many skulls in which the tympanic bone is not affected there is a downward development of the mastoid portion of the bone, a large mastoid cell area, and this carries with it the tympanic bone, so that the meatus is not materially altered.

In the skulls artificially elongated, while not so many were examined, yet there was consistently shown marked upward curving of the linea temporalis toward the lambda, increased antero-posterior diameter of the base of the mastoid portion of the temporal, posteriorly extending to the occipital by a broad tongue-like extension of bone similar to that occurring at times in the temporal fossa and articulating the squamo-zygomatic with the frontal bone. In the former instance the masto-occipital suture in each case becomes exceedingly complex and often contains an intercalary bone. This may be a development simulating formation of intercalary bones in sutures where Nature finds it necessary to increase the capacity of the skull. In these specific instances of deformation where the brain is forced to develop postero-superiorly and demands room for growth above, the bony space in the skull must be increased and so the development of the tongue-like process of the mastoid to fill in this space. This provision of Nature has its analogue, or vice versa, in the beforementioned tongue-like development of the frontal fossa; the developing frontal lobe causing a pushing forward and widening of the anterior angular form of the superior and inferior leaves of the bone, as found in the lower species, into a well-rounded curve presenting the frontal eminences; the tongue-like processes of bone from the temporal push forward and fill in the space. Of course these are only isolated cases in the frontal example, but they show the manner in case of need; and the cause back of the need in these developments requires further elucidation.

Many specimens of dolichocephalic skulls showed dehiscence in the glenoid fossæ opening into the inner end of the external auditory meatus, and the glenoid fossæ were in many instances widened antero-posteriorly. In such cases the Glaserian fissure is particularly wide and it will be noticed that in two of these specimens this widened fissure also contained long oval intercalary bones (which may be identified with that part of Meckel's cartilage having to do with the preformation of a portion of the malleus).

It would be interesting to note the upward curved linea temporalis in relation to the cerebral fossa in these cases and also to ascertain the significance of these intercalary bones — occurring in the two positions — in this type of skull, as they occur in that form in the Inca skulls, giving rise to the much disputed "os Incæ," or "epactal bones" (Dr. W. Matthews: Am. Anthrop., p. 338).

The most noticeable changes, however, occur in the tympanic portion of the temporal bone. In nearly every skull in which the shortening of the antero-posterior basilar diameter is at all marked, the tympanic bones are either irregular in form, showing nodular formations presenting into the external auditory canal, are flattened antero-posteriorly, the long axis of the meatus more nearly perpendicular than normal, or the orifice, if regular, is very strongly contracted owing to the material thickening of the bone itself and a shortening of the Ravinian fissure.

This characteristic of many of the aboriginal skulls has been noted and mentioned in writings by many investigators, but has always been termed exostoses of the external auditory canals and been ascribed to a peculiar obliquity in development in these people. William Turner writes in 1878 in the *Journal of Anatomy and Physiology* that in 1864 Professor Seligman directed attention to the presence of exostoses in the external auditory meatuses of some specimens of American crania which *had undergone artificial elongation*. He further says that though many crania, both European and exotic, have passed through his hands through a number of years, he has not seen one with exostoses in the external auditory meatuses until recently and that skull was from Pisagua, Peru, and was markedly antero-posteriorly deformed. He describes minutely the abnormalities and compares them with Davis' in *Thesaurus Craniorum*. After stating, however, that the only exostoses which he ever saw occurred in artificially deformed skulls, yet he does not think that the deformation of the skull was the cause but "there would thus appear to be a tendency on the part of the aboriginal inhabitants of the American Continent to possess modifications in the configuration of the external auditory passage."

It is true that many of the skulls of aborigines do not show any noticeable changes in the temporal bone, even some of those which show an attempt at artificial deformation, but this is easily explained by the inaccuracy of the methods used and the displacement of the mechanical devices — particularly those for antero-posterior shortenings — too early removal of the devices, which were kept in position any length of time from a few weeks to the end of the first year, and again on the particular type of bones in the individual. Those having hard diploetic skull bones showed the most marked deformities of the temporals while often those having the more pneumatic type of bones evinced no unusual formation of the temporal bones even though there might be marked cranial vault deformity. But again this latter class of skulls does not show such strongly marked encroachment of the basilar structures on each other as are to be found in the former type of skulls, and in the former type the suture lines were, in proportion to age in the two types, found to be more

advanced in the process of ossification. Another fact to be noted in this connection is that in the type of skull shortened antero-posteriorly the pressure often became displaced so that one side was much more strongly contracted than the other and in these specimens the tympanic bone, particularly, often was markedly malformed on one side, that being the side on which the greater pressure was exerted, and presented the characteristic nodular form, so-called exostoses of the meatus.

The shortening of the basi-cranial antero-posterior axis was brought about in the cranially deformed individual mostly, if not entirely (so far as gross manifestations indicated) by the contraction to a greater or less extent of the foramen lacerum medius and the foramen lacerum posterior and the forcible impingement of the sphenoid and occipital bones respectively on the anterior and posterior margins of the petrous portion of the temporal bone.

In many instances the above foramina — normally wide slit-like openings — were reduced to the smallest possible dimensions. The basi-cranium of those subjects which present the most pronounced results of these types of compression appear like a solid mass of irregular bone, instead of being made up of several separate and distinct bones joined by sutures.

Fronto-occipital pressure in the developing skull results in the inability of the skull to expand either upward and forward or downward and backward in consequence of which the brain growing and expanding, the pressure must be equalized in directions upward and backward and, diametrically, downward and forward. A question arises here as to whether the pressure is exerted by and through the brain *per se* or is entirely transmitted by the separate and different bones through their sutural margins, the high probability being that it is transmitted in both ways. The parietal bones, held between the vice-like compression of the frontal at the coronal suture anteriorly and the occipital at the lambdoidal suture posteriorly, become shortened along the base-line of the arc by the approach of the coronal toward the lambdoidal suture and so they form a higher and more precipitate arch as they develop either at the parietal eminences, or at the crown along the sagittal suture if the influencing pressure is exerted sufficiently from the lateral aspects to also shorten and heighten the arch laterally.

As the complemental expansion occurs upward and backward a diametric pressure is exerted downward and forward by means of the parietal bones transmitting the effects of the pressure along the lateral antero-posterior suture to the petro-mastoid at the junction of the lateral antero-posterior suture with the lambdoidal and the squamo-temporal respectively, insinuating the former (petro-mastoid) inward and forward toward the basilar axis and also impinging the posterior half of the tympanic bone, driving it forward to be caught and repressed anteriorly by the squamo-temporal which is also by the same process pushed downward involving in the compression the anterior segment of the tympanic bone so that it can develop unrestrictedly in neither direction, anterior and upward or posterior and upward, but must follow the line of least

resistance and curl from either extremity inward on its axis. This narrowing of the space of the normal development of the tympanic bone is also further increased by the direct transmission of pressure from the orbito-frontal plate through the greater wing of the sphenoid and thence to the squamo-temporal anteriorly, pressure being thus propelled directly against the anterior segment of the temporal bone.

These processes are further increased by the fact of the squamosal ossifying at the earliest stage — just after birth — in the directions upward, outward and forward, and therefore encroaching in those directions from which pressure is already being made in the very impressionable skull, and also ossifying outward involving at once its tympanic division which at the time of birth has become attached to it at its two terminals, anterior and posterior.

The interesting observation as to the effect of the compression on the internal auditory meatus located immediately above the jugular foramen was rendered impossible owing to the presence *in situ* of the calvaria.

1. Ancon, Peru. Brachycephalic, not extreme; auditory canals normal.
2. Peru. Brachycephalic, extreme; auditory canals normal.
3. Brachycephalic, not marked; auditory canals normal.
4. Brachycephalic, not marked; auditory canals normal.
5. South Sani. Brachycephalic, not marked; auditory canals normal.
6. Brachycephalic, not marked; auditory canals normal.
7. Ancon, Peru. Brachycephalic, not marked; auditory canals normal.
8. Brachycephalic, parietals not prominent; auditory canals normal.
9, 10 11. Children's skulls, not deformed; auditory canals normal.
12. Ancon, Peru. Brachycephalic, short basilar index. Exostoses in each auditory canal, but larger in one than in other, making auditory canals into an S-like slit.
13. Ancon, Peru. Flat frontal, but occiput normal, and auditory canals large, round and funnel-shaped.
14. Ancon, Peru. Slightly brachycephalic, no exostoses but auditory canals narrowed symmetrically in antero-posterior direction and the long diameter nearer perpendicular than normal.
15. Ancon, Peru. Brachycephalic; auditory canals clear but antero-posterior diameter shortened, not extremity.
16. (Male) markedly brachycephalic; auditory canals narrowed on either side to slit-like orifices, perpendicular diameter.
17. Ancon, Peru. Not brachycephalic; auditory canals normal.
18. Ancon, Peru. Brachycephalic, bones more pervious than in previous brachycephalic skulls examined, and with this condition nasal and facial bones are developed in long supero-inferior axis, giving a long index from anterior margin of foramen magnum to superior alveolar process; mastoid large and much elongated. Auditory canals narrowed antero-posteriorly; long diameter, more nearly perpendicular and lengthened.
19. Ancon, Peru. Not brachycephalic; auditory canals normal.
20. Negro. Not brachycephalic; auditory canals large, round and funnel-shaped.
21. Ancon, Peru. Brachycephalic; auditory canals very small. In the right one the antero-posterior diameter is shortened, but the left one is rounded.
22. European. Not brachycephalic; auditory canals large and oval.
23. Not located. Idiot. Brachycephalic (not artificial), with high frontal and parietals. Auditory canals normal except long diameter nearly horizontal.

24. Ancon, Peru. Not brachycephalic; auditory canal normal with long diameter nearly vertical.

25. Chinook, Columbia River. Child, not deformed; auditory c—* normal.

26. Ancon, Peru. Brachycephalic and asymmetrical; greatest compression over right frontal, so that left frontal and left parietal are higher than right ones. Auditory c— have long diameter nearly vertical with bony hypertrophy extending into canals from posterior margin of tympanic bone.

27. Ancon, Peru. Brachycephalic; auditory c— very small and round; the tympanic bone curled around instead of forming exostotic enlargements.

28. Ancon, Peru. Brachycephalic; auditory c— narrowed by thickening bone antero-posterior and long diameter is vertical.

29. Sierra Gorda, Peru. Dolichocephalic; auditory c— normal but long diameter practically vertical.

30. Ancon, Peru. Slightly brachycephalic; auditory c— normal but long diameter practically vertical.

31. Ancon, Peru. Not brachycephalic; auditory c—; the right has small exostoses, anterior and posterior; the left has large posterior exostosis, and a small one anterior and above.

32. Ancon, Peru. Brachycephalic; auditory c—: right, small, antero-posterior diameter much shortened by general thickening of tympanic bone and long diameter vertical; left, slit-like form, an encroaching enlargement of posterior upper end of tympanic bone.

33. Ancon, Peru (probably). Brachycephalic; auditory c— clear but long diameter approaches a more horizontal position than normal.

34. Comox. Metacephalic; auditory c— normal, very large; long diameter nearly vertical.

35. Brachycephalic, but not apparently artificially compressed; auditory c— small, oval with long diameter vertical.

36. Ancon, Peru. Brachycephalic; auditory c— are coffee-bean shape; left one having depression posterior and right one reversed. Long axis vertical.

37. Ancon, Peru. Brachycephalic, auditory c— narrowed antero-posteriorly. thickening of tympanic bone and long diameter vertical.

38. Not located. Dolichocephalic, auditory c— large and of normal shape.

39. Not located. Metacephalic, but with very flat sloping frontal bone and prominent occiput; auditory c— large and round becoming funnel-shaped as they progress mesiad.

40. North Caledonian. Dolichocephalic, marked prognathism; auditory c— round and funnel-shaped.

41. Ancon, Peru. Brachycephalic; auditory c— normal except that long axis is more nearly vertical than normal.

42. New Guinea. Dolichocephalic; auditory c— large, oval, with long diameter nearly vertical.

43. Not located. Dolichocephalic; auditory c— large and oval, with long diameter upward and forward, downward and backward.

44. Corvitchin Wharf. Antero-posterior compressed apparently artificially and asymmetrically, the compression being from one side anterior with opposite side posterior; auditory c— very small and contracted, longer diameter being horizontal rather than vertical.

45. Not located. Brachycephalic, frontal much flattened; auditory c— very small, almost round, but with slightly longer diameter in a vertical position.

46. South Sanitch. Brachycephalic, flat frontal asymmetrical with high bulging parietals; auditory c— much smaller than normal, the left being smaller than the right, but the form oval, and the long diameter normally placed.

47. "Booboo Mobani." Metacephalic; auditory c— large and almost perfectly round.

48. Ancon, Peru. Metacephalic, no antero-posterior flattening; auditory c— normal.

---

*c—= canals.

49. Not located. Metacephalic, auditory c— normal.

50. Ancon, Peru: Metacephalic, frontal not flattened, auditory c— normal.

51. Not located. Metacephalic with receding frontal and prominent occiput (cannot determine whether or not artificially flattened); auditory c— normal.

52. Ancon, Peru. Brachycephalic, flattened frontal and prominent parietals; auditory c— abnormally small and long diameter vertical.

53. Scuth Sanitch. Metacephalic; auditory c— small and coffee-bean shaped, longer diameter forward and upward, downward and backward.

54. Ancon, Peru. Metacephalic; auditory c— small, long diameter vertical; left canal bony projection in lower posterior quadrant, and right has bony projection in upper anterior quadrant.

55. Not located. Dolichocephalic; auditory c— small, nearly round, but slightly longer diameter vertical.

56. Negro. Dolichocephalic; auditory c— free from projections, funnel-shaped (growing smaller in diameter, mesiad), but externally having slightly longer diameter upward and forward, downward and backward.

57. Ancon, Peru. Metacephalic; auditory c— large, free, and oval with long diameter almost vertical.

58. "European." Metacephalic; auditory c— medium large, oval, long diameter upward and forward, downward and backward.

59. Hottentot. Dolichocephalic; auditory c— large and very nearly round, but having slightly longer diameter upward and forward, downward and backward.

60. Songish (Indian). Brachycephalic; auditory c—very small but free and oval with long diameter upward and forward, downward and backward.

61. Peruvian. Metacephalic; auditory c— small but normal in shape.

62. "European." Not deformed; auditory c— large, oval, long diameter upward and forward, downward and backward.

63. "European." Metacephalic; auditory c— normal.

64. Ancon, Peru. Metacephalic, auditory c— very small, but otherwise regular in form.

65. Ancon, Peru. Antero-posterior artificial compression but asymmetrically, being from right downward to left posteriorly; auditory c— unequal, the right one being larger and oval with long diameter upward and forward, downward and backward, this side having occiput larger, fuller, and lower level of parietal eminence, the left canal is small and nearly round, but no projection, the occiput being very compressed and the parietal eminence high.

66. Ancon, Peru. Brachycephalic; auditory c— have no bony projections but are flattened in general antero-posteriorly, but still have longer diameter extending in direction upward and forward, downward and backward.

67. Laplander. Metacephalic; auditory c—: left very large and appears as if dilated (scooped out), but is oval with long diameter forward and upward, downward and backward; right canal normal.

68. Not located. Dolichocephalic; only one auditory canal present (other broken away) which is contracted antero-posteriorly and has small bony projection on posterior upper outer margin of tympanic bone.

69. Not located. Metacephalic; c— normal.

70. Not located. Dolichocephalic; c— large and normal in form.

71. Not located. Brachycephalic; short antero-posterior diameter but canals normal.

72. Not located. Dolichocephalic; c— large and regular in form.

73. Not located. Metacephalic; auditory c— large; long diameter far forward as it extends upward and forward, downward and backward.

74. Ancon, Peru. Child; c— normal.

75. Not located. Metacephalic; auditory c— normal, except long diameter is nearly vertical.

76. Not located (child). Metacephalic; auditory c— large and free from excrescences. Auditory canal, each side dehiscent posterior at inner margin of glenoid fossa, anterior to fossa of bulbus jugularis and external to carotid canal.

77. Not located. Brachycephalic. Antero-posterior compression asymmetrical being more marked on left frontal with right occiput. Auditory c—: nothing remains of either but slits, owing to large bony projections from posterior upper edge of tympanic bones which curl into c— giving each a nearly semicircular form.

78. European. Metacephalic, frontal bone not compressed; auditory c— free, large and oval, long diameter upward and forward, downward and backward.

79. South Sanitch. Brachycephalic, left frontal more compressed than right and high left parietal with compressed right parietal; auditory c— small and nearly round, but slightly longer diameter almost transverse.

80. American. Brachycephalic; auditory c—, free and as usually found except longer diameter is slightly more vertical.

81. Papuan. Metacephalic; auditory c— normal.

82. South Sanitch. Brachycephalic; antero-posterior compression asymmetrical being greater from left frontal with right occiput; auditory c— small and nearly round with slightly longer diameter vertical.

83. Bushman. Dolichocephalic; auditory c— larger than normal and more nearly round.

84. Ancon, Peru. Child. Metacephalic; auditory c— normal.

85. Ancon, Peru. Metacephalic; auditory c—: left has small excrescence at antero-upper margin of tympanic bone and a larger one at posterior upper margin of tympanic bone. Right canal is regular in form but narrower antero-posteriorly than normal.

86. South Sanitch. Brachycephalic; auditory c— regular but smaller than normal.

87. Not located. Brachycephalic; auditory c— are narrow slits caused by curling up of tympanic bones but only small bony excrescences in the meatus anterior and posterior.

88. Kwakiutl. Dolichocephalic; auditory c— small, oval with antero-posterior diameter shortened and long diameter nearly vertical.

89. Ancon, Peru. Brachycephalic; auditory c— small, contracted antero-posteriorly and right has large bony excrescence at upper posterior edge of tympanic bone.

90. Ancon, Peru. Metacephalic; auditory c— small but regular in form.

91. South Sanitch. Brachycephalic; auditory c— antero-posteriorly narrower than normal but regular in form.

92. Chancay, Peru. Metacephalic; auditory c— smaller than normal, the long diameter being nearly vertical; the meatal walls are smooth and regular but diameter is made smaller by thickening upward and inward of the anterior edge of tympanic bone.

93. Chancay, Peru. Brachycephalic; auditory c— small with slight thickening of the anterior edge of tympanic bone which, had the subject become older, would in all probability have developed into a bony excrescence.

94. Not located. Brachycephalic; auditory c— round and funnel-shaped.

95. Chancay, Peru. Brachycephalic; auditory c— small but regular.

96. Not located. Metacephalic; auditory c— small but regular.

97. Not located. Brachycephalic; auditory c—: right one narrow and slit-like with long diameter nearly vertical and a small excrescence at the posterior upper margin of tympanic bone and a pronounced general thickening of the anterior upper margin of the bone. Left canal entirely closed with exostotic growths, the posterior larger and curled over anteriorly into the lower part of the canal and above it and curling posteriorly, the thinner curled hypertrophic growth of the anterior margin of the tympanic bone.

98. Not located. Metacephalic, showing evidence of artificial deformation. Auditory c—; left narrowed to an irregular slit, with axis vertical. This closure is caused by a regular thickening and the formation posteriorly of two unequally thickened plaques. Right canal is altered only in having the long diameter nearly vertical. (On the left side this skull has a paramastoid process and shows slight dehiscence of bone posterior to and mesiad from the temporo-maxillary articulation.)

99. Mound builder. Metacephalic, not artificially deformed, bones slight in texture; auditory c— large, round, externally and contracting mesiad to become funnel-shaped.

100. Ancon, Peru. Brachycephalic; auditory c— regular in form but very small, the tympanic bone being consistently thickened.

NOTE.—Parenthetical numbers refer to case and individual specimens in the Field Museum of Natural History. c—=canal.

SKULLS FROM CULIN, VANCOUVER ISLAND

1. Dolichocephalic; artificial; coronal suture bandaging; tympanic bones thin; right meatus larger than left; right meatus long diameter perpendicular; left meatus long diameter slightly upward and forward, downward and backward. C— larger than in European skulls.

2. Kwakiutl (40785), British Columbia. Dolichocephalic; frontal pressure; bones are small and slight; tympanic bones thin and do not extend up well posteriorly on to the mastoid portion. C— small but regular with long diameters extending slightly in direction upward and forward.

3. Salmon River (40799). Five-year-old child. Dolichocephalic but apparently not artificial. Tympanic bones the same as in (40785) as to thinness and position. C— large, oval and long axis upward and forward. Glenoid fossæ both very large, broad antero-posteriorly and dehiscence of the tympanic bones leading from the external auditory canal into the inner and posterior part of the articular area. Glaserian fissure very marked on both sides.

4. Stone Graves, etc., British Columbia (40772). Very thick diploetic type of bones. Dolichocephalic; flattened frontal. Tympanic bones thick but short in upward direction on posterior aspect. Right meatus oval with long diameter perpendicular. Left meatus round.

5. Krooste head (41519) (182). Heavy thick bones; massive face. Dolichocephalic but not markedly and not artificially deformed; exceedingly long styloid bones and heavy; tympanic bones thick and heavy with large vaginal processes. C— large and oval, slightly antero-posteriorly shortened on right side and long diameter nearly perpendicular; on left side more rounded with normally placed long diameter.

6. Same drawer (182), second head toward rear of drawer. (Has loose ossicula in left ear). Same as above but more round headed and shows large bone wound in frontal mid-line immediately above frontal sinus. Otherwise same as above. Auditory c— have long diameter more upward and anterior.

7. North Island (F.) (41512) (174). Not deformed. Dolichocephalic. Bones thin and slight; styloids very long and strongly inclined forward, more than usual. Tympanic bones both dehiscent into glenoid fossæ. Tympanic bones very thin and slight and c— large with long diameter normal.

8. North Island (41529) (166). Female. Same general character as above. Inclination of styloids forward. Tympanic bones not dehiscent and not large. C— large with long diameter normal.

9. North Island (41514) (173). Female. Beautiful specimen. Bones much more massive than the above; not deformed; dolichocephalic; no dehiscent tympanics. Tympanic bones very thick and heavy. C— normal but not as large as in above, owing to thick tympanic bones.

10. (41528) (165). Female. Bones heavy; head same as in (41514); tympanic bones thick and heavy; C— smaller than in the first of this set, but regular and normal in shape. Styloids strongly inclined forward but broken. (Left side posterior to digastric fossa long thick exostosis posterior to jugular bulb. Paramastoid?.)

11. North Island (41518) (157). Male. Bones heavy and massive. (Had incus in left ear). Very long, strongly anteriorly inclined styloids. Dolichocephalic with rather flat frontal but not deformed. Tympanic bones not as thick and heavy as in one of the previous North Islanders, but have the thickened inferior

elongation down along the styloids. C— large, oval exostoses, and funnel-shaped extending inward. Long diameter normal.

12. Kwakiutl (40672) (1305). Male. Very dolichocephalic, binding around posterior to coronal suture. Supra-occipital very elongated from inion to foramen magnum. Mastoid process at base is elongated and thickened antero-posteriorly. Zygoma very long and arch is flattened transversely.

13. Kwakiutl. North Vancouver Island (40521) (1307). Female. Dolichocephalic. Apparently not bound but flat frontal. Squamo-temporal is long antero-posteriorly. Auditory c— comparatively large and nearly round, the tympanic bones being comparatively thick and massive, and the skull small but comparatively massive.

14. Kwakiutl (May's Place, No. 28) (40528) (1304). Dolichocephalic, artificial, circular bandaging. Base of mastoid very broad antero-posteriorly, squamo-temporal elongated from squamo-zygomatic juncture and linea temporalis has strong inclination upward and backward toward occiput. Bones not very massive. Tympanics rather slight and thin, and c— large, oval, with long diameter normal, but slightly shorter antero-posteriorly than normal.

15. Kwakiutl (Cape Commerall) (No. 66) (40507) (1318). Strongly dolichocephalic; bandaging around posterior frontal and posterior to coronal suture and infra-occipital. Bones comparatively massive but tympanics thin and slight. C— small but regular except slightly shorter in antero-posterior direction than normal, and long axis perpendicular. Linea temporalis strongly inclined upward toward posterior parietal eminence position, and base of mastoid immensely elongated and at juncture with sagittal suture a strong formation like accessory suture bones. The sagittal suture continuing down mesiad to the digastric fossa separating the mastoid from the supra- and basi-occipital, very open and free showing that it must have been kept open for the development of this part of the skull as the other parts are more repressed (compensatory). (May see here the natural arrangement for skull growth.)

16. Kwakiutl (40510) (1303). Male. Dolichocephalic and has been circular bandaging but not very successfully. Shown mostly by elongation posteriorly of supra-occipital. Bones rather slight. Tympanics thin and c— as usual with long diameter upward and forward, downward and backward. Base mastoid slightly elongated but same complex bony arrangement at juncture with sagittal suture which suture is almost obliterated.

17. Kwakiutl, May's Place (40528) (1304). Male. Dolichocephalic but not strongly, has been bandaged as usual. Bones slight. Tympanics thin and c— large, oval, with axis normal. Mastoid bones are the same as in (40510).

18. Kwakiutl, North Cape Scott (40526) (1310). Female. Bones heavy for female. Dolichocephalic but apparently never bandaged. Linea temporalis almost entirely horizontal in position but base of mastoid very wide antero-posteriorly. Tympanics thick and heavy with long heavy vaginal processes extending over on the styloids. Squamo-temporal-zygomatic very long antero-posteriorly and same formation bone at mastoid juncture with sagittal suture as before. Auditory c— small but regular.

19. Kwakiutl (40786) (1309). Female. Very dolichocephalic. Bones very slight. Bandaging circular around supra-occipital and posterior to coronal suture, scarcely any over frontal, and squamo-temporal bone has been mostly excluded, but posterior part of the base of the mastoid is very elongated and complex at juncture with sagittal suture. Linea temporalis is normal and that line seems to extend strongly upward only where bandaging has included the squamo-temporal. Tympanics comparatively thick and strong vaginal processes on styloids. Right meatus is large and round. Left meatus not so large but oval and long axis is perpendicular. Supra-occipital is immensely elongated. A peculiar feature of this skull is that the elongation is so abrupt and constriction around is so acute that at squamo-temporal articulation with frontal and parietals these two bones on each

side recede suddenly from the articulation, making the articulation a very prominent irregular ridge which is not quite so marked on right as on left because in frontal view the frontal is irregular (asymmetrical), the left antero-temporal region being more bulging outward than the right which gives a shorter perspective in this view than on the right side, but again there is a slightly greater depression posterior to this where bandaging has been done, hence compensatory ridge on left anterior. Again there is a decided deviation of posterior part of the vomer running superior to left and inferior to right, at posterior margin the bone being thin as tissue paper and the hard palate being high but comparatively broad.

20. Kwakiutl (Cape Commerall) (40523). Female. Very dolichocephalic. Bones very slight. Bandaging circular around supra-occipital and posterior to coronal suture, scarcely any over frontal and therefore temporal bone has been excluded, but posterior part of the base of the mastoid is very elongated and complex at juncture with sagittal suture. There has apparently been greater pressure on posterior part of squamo-temporal because it is not quite so elongated perpendicularly. Auditory c— are narrow and slit-like with long axis perpendicular.

21. (40684) (1201). Males. (Following three from tribe Cowichan, Quamichan Village). Salmon River. Very solid, heavy bones. Brachycephalic, from pressure either at upper angle supra-occipital and posterior angles of parietals or that combined with high frontal pressure. Skulls all irregular laterally with irregular high parietal eminences.

22. (40684). Very short supra-occipital from foramen magnum to occipital eminence and strong curve to upper posterior supra-occipital. Tympanics heavy but not broad. Auditory c— both strongly funnel-shaped and oval, but long axis almost horizontal.

23. (40738). Very short supra-occipital from foramen magnum to occipital eminence and strong curve to upper posterior supra-occipital. Tympanics heavy but not broad. Auditory c— not so horizontal as above but small and very flattened in a semi-antero-posterior direction. Linea-temporalis strongly turned up toward the compensatory elevated parietal eminences.

24. (40877). Very short supra-occipital from foramen magnum to occipital eminence and strong curve to upper posterior supra-occipital. Bones not so dense but tympanic bones thicker than the two preceding. Right auditory meatus oval and long axis nearly horizontal; left irregularly round (apparently an old person —some absorption in alveolar process).

25. (Case 18, East Court, So.) Kwakiutl. No number. Artificial dolichocephalic, bandaging around frontal and posterior to coronal, extreme elongation supra-occipital, and parietals come to a single prominence posteriorly. Base mastoid very broad antero-posteriorly and a complex bony arrangement at juncture of sagittal suture. Bones not specially massive. Tympanics comparatively thin. C— small antero-posteriorly and long axis in left is perpendicular; in right, is removed from normal, extending upward and backward, downward and forward.

26. Case 18 (40406 by Lieut. Stafford), Oruro, Bolivia. Not massive, extreme elongation, but very regular from frontal sinus to apex of parietals. Left temporal bone is absent. Right tympanic is very thin and dehiscent in glenoid fossa. C— very large and oval with longer axis inclined upward and backward, downward and forward. (Fine subject to study spheno-ethmoid angle.)

27. Case 18 (40399). Arica, Peru. Extreme elongation from frontal sinus to crown of parietals but latter not so pointed as in (40406). Frontal most compressed and again posterior to coronal suture. Linea-temporalis has strong inclination upward and backward toward juncture of occipital with parietals. Mastoids long antero-posterior base but made mostly by accessory bone on left side in sagittal suture and same on right side. Tympanics thin and slight. C— ovoid with long axis perpendicular.

28. Case 18 (50413) Huaracondo, near Cuzco, Peru. Very young, twenty years or so. (Beautiful head for study of sutures and nasal septum.) Bones slight and thin; elongated not extremely but markedly, with greatest compression

posterior to coronal suture. Supra-occipital very long and has interparietal bone, also each glaserian fissure contains small oval intercalary bone. The tympanics are very slight and thin, left has dehiscence and right is very thin in spots. Auditory c— large, right one larger than left, and more nearly round but still ovoid as is the left. Accessory bone in right glaserian fissure larger than left and long axis of c— perpendicular. Ravinian notch in either ear very broad owing to the fact that the tympanics do not extend up posteriorly on the mastoid except to just form the floor and curve. Linea temporalis strongly inclined upward and posteriorly; mastoid much elongated back towards sagittal suture.

29. (40278). Case 20. Inca, from Huaracondo, Peru. Markedly elongated with lateral depression over frontal and dehiscence posterior to coronal suture. Bones comparatively massive. Mastoid part of temporals seem to have developed immensely to the loss of the posterior part of squamous, the articulation of squamo-temporal and parietal making a straight line leading rapidly downward as it extends posteriorly from a point immediately over (or above) the squamo-zygoma. All the sutures except the sagittal are very straight (not corrugated) and all sutures, except sagittal are ossified almost entirely. Tympanic bones thin but wide supero-inferiorly to fill in wide declivity between zygoma and largely developed mastoid, and tympanics have large vaginal processes and tympanics do not extend up on the anterior wall of the mastoid, except as above, enough to form the floor of the c— and become attached to mastoid. C—large, oval and normal axis.

30. Case 31 (40279). Inca, from Cuzco, Peru. Moderately elongated. Skull thick and bones of mastoid developed back to sagittal suture and very complex at juncture. Tympanics thin and wide but with comparatively large vaginal processes and very long styloid. Dehiscence in right glenoid. Auditory c— large, ovoid, funnel-shaped, with long axis normal. (Malleus and incus in right middle ear, removed.) Right meatus much larger than left and posterior to digastric fossa a long tubercle which has extended down and ends by a square facet which has apparently articulated with the lateral process of the first vertebra (para-mastoid?).

31. (40669). Case 23. Kwakiutl. Bones medium but very elongated as other Kwakiutl skulls; extreme frontal and posterior coronal depression. Mastoid very elongated posteriorly and complex articulation with occipital; right has extreme long styloid. Linea temporalis much inclined upward and backward. Tympanics comparatively thick, c— oval, comparatively small and upper anterior edge both sides turned downward into top of c— but no nodular enlargement.

32. (40112). Case 24. Thick heavy bones. Peruvian. Brachycephalic, artificial frontal and occipital pressure with both tympanic bones curled up at postero-inferior edge, and large nodule almost entirely filling c—.

29 E. Madison Street.

BIBLIOGRAPHY

"De Aeris, Aquis et Locis," concerning Macrocephali. Sydenham Society's Edition, by Dr. Adam, i, 270.
Topinard: Anthropology, p. 179.
Greenwell and Rolleston: A Record of the Sepulchral Mounds in Various Parts of England.
Topinard: Anthropology, pp. 179, 180.
Roosevelt: "African Game Trails."
Barrett, O. W.: Impressions and Scenes of Mozambique, National Geographic Magazine, xxi, No. 10, p. 825, October, 1910.
Flower: Essays on Museums, p. 335.
Squier: Nicaragua, ii, 345.
Torquemada: Book xiv, ch. 24.
Spencer: Descriptive Sociology of Ancient Mexicans, Central Americans, etc., p. 27.
Spencer: Des. Soc. Ancient Mexicans, Central Americans, etc., p. 28.
Santa Cruz: Narratives, p. 78.
Jour. Anat. and Physiol., 1878, p. 200.
Thesaurus Craniorum: Davis, p. 245.

ILLINOIS MEDICAL JOURNAL

THE OFFICIAL ORGAN OF THE ILLINOIS STATE MEDICAL SOCIETY

GENERAL OFFICERS 1912-13

PRESIDENT - - - - L. H. A. NICKERSON, QUINCY
PRESIDENT-ELECT - - CHARLES J. WHALEN, CHICAGO
FIRST VICE-PRESIDENT - - SAMUEL E. MUNSON, SPRINGFIELD
SECOND VICE-PRESIDENT - WATSON H. CURTIS, WILMINGTON
TREASURER - - - - - - A. J. MARKLEY, BELVIDERE
SECRETARY - - - - - EDMUND W. WEIS, OTTAWA
(Ex-officio Clerk of the Council.)
EDITOR - - - - - GEORGE N. KREIDER, SPRINGFIELD
522 Capitol Avenue.
ASSISTANT EDITOR - - GEORGE EDWIN BAXTER, CHICAGO
4603 Evanston Avenue.

THE COUNCIL

J. H. STEALY, FREEPORT.
J. A. MARSHALL, PONTIAC.
CLYDE D. PENCE, CHICAGO.
J. F. PERCY, GALESBURG.
J. WHITEFIELD SMITH, BLOOMINGTON
CARL E. BLACK, JACKSONVILLE.
J. Q. ROANE, CARLYLE.
E. B. COOLEY, DANVILLE.
FRANK C. SIBLEY, CARMI.

NOVEMBER, 1912

SLANDERING THE MEDICAL PROFESSION

Under date of October 2, 1912, the Secretary of the Illinois State Board of Health sent out from Springfield a statement which has been copied in a number of daily papers in Illinois. The statement was that physicians have been charged with selling free antitoxin which was supplied to them for use in their practice without cost to their patients. As to the truth or falsity of this charge we know nothing, but evidently it is a serious matter to send out any statements of this sort without giving names of those abusing the law and proof of the charges. A number of marked papers have been sent to us, in which the headlines would indicate that this matter had been thoroughly proven. On perusing the article, however, we find that charges have been made, but no names, places or dates given where it had been proven. We challenge Secretary Egan to produce the proof that any member of the State Medical Society has been guilty of such outrageous conduct. If a guilty one should at last be found, we venture the statement that he will be found a graduate of some inferior school permitted to exist by grace of the Illinois State Board of Health. We have received letters strongly resenting the charges made by Dr. Egan insinuating that members of the profession are "petty thieves." The evident purpose in sending out any communication of this character at the present time is a political one, since but twelve lines are devoted to the unproven charge, while seventy-five lines, in one of the papers sent to us, are devoted to laudation of the Board and the present incumbent of the gubernatorial chair.

TYPHOID FEVER

On another page will be found a map prepared by the Director of the State Water Survey, Professor Edward Bartow, of the University of Illinois, which, in a large measure, tells its own story. A peculiarity that attracts attention first, is the fact that six counties in the south of the state, and three counties in the extreme north have a very bad record; also that such intelligent communities as Alexander, Clark, Franklin, St. Clair, Clinton, Marion, Adams, Warren, Knox and Kane counties follow but little behind these six counties in the prevalence of this preventable disease. We have long known, and a number of times called attention to the fact that typhoid fever, the opprobium of sanitary science, prevails unnecessarily in our state, and we fear that under present conditions there is little hope of improvement. An eradication of the disease could be brought about by a systematic campaign of education among the people. We trust all our readers will use this map for educational purposes among their clients, and that in a few years it will not be possible to show such disgraceful conditions existing in the state of Illinois.

FLEXNER'S ABILITY APPRECIATED IN GERMANY, BUT NOT IN ILLINOIS

A. Flexner—Medical Education in Europe—Carnegie Foundation, 1912.

"A remarkable work of 350 pages which is based on a thorough study of the education of doctors in England, France and Germany. The material is not only valuable as a work of reference, but above all comparatively and critically composed. With every acknowledgment which is due to the art of teaching in Germany, the author does not hesitate to lay his finger on the weak spots. Our commissioners of education will do well to pay serious attention to the material here assembled."

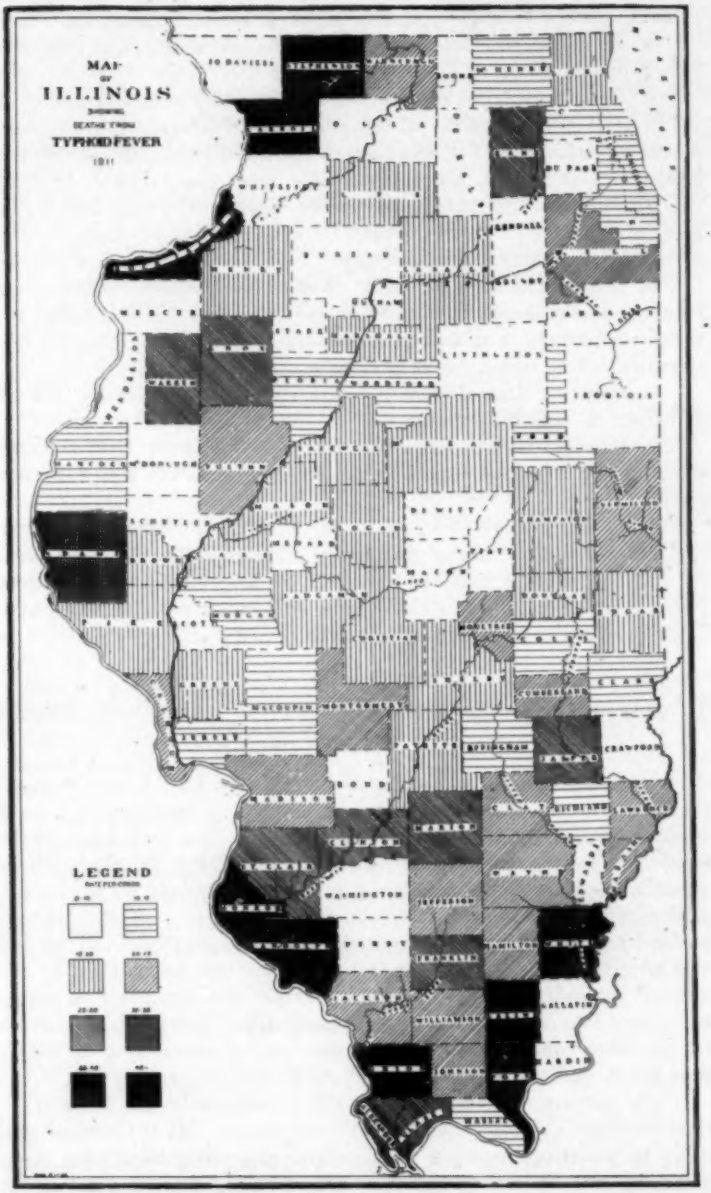
Professor Garré, of the surgical chair at Bonn University, thus reviews Flexner's work in the *Deutsche Zeitschrift für Chirurgie* for September, 1912. Our readers no doubt well remember the discourteous language used toward Abram Flexner two years ago by those two learned gentlemen, the President and Secretary of the Illinois State Board of Health. The occasion for their abuse of Flexner was of course because he told the truth concerning the Board of Health and the rotten Chicago medical schools which they uphold.

RULES FOR THE MANAGEMENT OF POLIOMYELITIS

PROMULGATED BY THE CALIFORNIA STATE BOARD OF HEALTH

1. Acute poliomyelitis should be regarded as an infectious disease and quarantined accordingly.

2. The period of quarantine shall be thirty days dating from the onset of the disease.


MAP
OF
ILLINOIS
SHOWING
DEATHS FROM
TYPHOID FEVER
1911
LEGEND

3. Premises shall be placarded as in other quarantinable diseases.

4. No persons, other than doctor, nurse or clergyman, who shall come in contact with the sick, shall enter or leave the premises.

5. Contacts and suspects shall be kept under observation for twenty-one days.

6. Cases must be reported to the local sanitary authority and by it to the State Board of Health. Every effort should be made to trace possible means of communication, especially when the disease first occurs in any locality. Use federal blanks obtainable from State Board of Health.

7. The same precautions should be taken in the care and management of poliomyelitis as in the cases of other infectious diseases, of which scarlet fever is suggested as the type.

8. Special attention should be given to discharges from the nose and mouth. These should be caught on material that can be burned or in vessels containing a disinfecting solution. Urine and feces should be sterilized before being placed in closets.

9. Domestic animals should be rigidly excluded from the sick-room and from all infected premises.

10. Before release from quarantine, the patient's and attendant's clothing and premises must be disinfected in accordance with standard methods.

11. In the presence of an epidemic, it is wise to forbid the congregating and assembling in any manner of children under 15 years of age.

12. Where the disease is prevalent, it is a safe precaution, where possible, to keep children strictly confined to their own premises, and in every case to avoid entrance of contacts.

A NEWSPAPER OPINION OF ETHICAL PROPRIETARIES AND THEIR USERS

Appreciating that proprietary nostrums, to a very large extent, owe their continued existence to the recognition given them by certain medical journals, and that these publications in turn owe their existence to the support given them by physicians, the Missouri State Medical Association at its last annual meeting adopted a resolution pronouncing it derogatory to the best interests of members to publish articles in medical journals whose advertising pages contain fraudulent or questionable advertisements. Naturally this action has not been praised by those medical journals which, to a very large extent, are dependent on nostrum advertisements for their existence—the so-called "independent journals." On the other hand, Missouri's action has been endorsed by a lay publication, the New York *Sun*, which said, editorially, in part:

"The absence of cooperation among physicians in the promotion of their interests is a matter of frequent observation. It is therefore gratifying to record an instance exemplifying the recognition of a danger menacing both the public and the profession, and the action taken by at least one organization to meet it.

"The State Medical Association of Missouri has adopted a resolution which pronounces it 'derogatory to the best interests of members to publish articles in medical journals whose advertising pages contain fraudulent or questionable advertisements.' The lay reader cannot realize the importance of this enactment, not for the doctor alone, but also for the interests of the public, which is the unsuspecting victim and the greatest sufferer from the abuses this resolution is aimed to correct, the prescription of secret nostrums and other proprietary drugs by physicians."

In commenting on this indication of public interest, the *Journal A. M. A.* (Oct. 5, 1912, p. 1307) suggests that, in view of the present wide-spread interest of the layman in all things medical, it is not surprising that the "proprietary" evil is beginning to be recognized as something entirely distinctive from the "patent medicine" curse.

OSTEOPATHS STILL OOZING

The Journal of the Medical Society of New Jersey, for October, copies our September caption and comments on the Osteopathic Research Institute which the Stillites have in mind, and makes the following remarks: "The Rockefeller Institute had better look for its laurels when this new research institution gets to work. But we note that the prime object of the osteopathic institution is 'to verify osteopathic theories'; so after all it will not seriously conflict or come in competition with the work of the Rockefeller Institute, which is seeking to know and to establish scientific truth and not to verify theories that may be far from the truth.

"But why should this new Chicago Institute 'seek for the cause of disease'? We thought that osteopaths claimed to know the cause—the one cause of disease—and knowing that, claim the ability to treat all diseases—including diphtheria, gonorrhea and syphilis—without the use of drugs, and appendicitis, gall-bladder disease and cancer without the use of the knife.

"We are led to question the statement of the preacher, in Ecclesiastes 1:9, that "there is no new thing under the sun"; but then we remember that that statement was not made in the twentieth century; if it had been, there would doubtless have been added except osteopathy, Christian Science, and recent styles of women's dress and headgear."

Correspondence

THE GOVERNOR AND THE STATE BOARD OF HEALTH

JACKSONVILLE, ILL., Oct. 22, 1912.

To the Editor:—In reply to your letter making inquiry regarding the efforts which the Council of the Illinois State Medical Society and others have made to secure the appointment of a representative Board of Health,

I will say that I am only too glad to give all the information possible regarding this very unpleasant subject.

While I would be the last man to use the state society as a political organization, I believe that in a matter so important as the State Health Department, which also is charged with the regulation of the practice of medicine, it is the duty of every right minded physician to make himself plain.

Every citizen should know that the condition of medical education in Illinois has been, and is, a disgrace. He should know that Indiana, Ohio, Missouri and other states have not only severely criticised Illinois, but some have positively refused reciprocity with this state on account of the low standard of our medical schools.

Every citizen should know that the only way in which the standards can be raised is by the earnest and conscientious action of the State Board of Health.

Every citizen should know that the Governor has allowed the term of office of all the members of the State Board, except one, to expire, and that he has failed to make new appointments, although he has repeatedly promised to do so.

Every citizen should recognize the fact that the only way to improve these conditions is to get the Governor to appoint a representative and progressive State Board of Health.

Every doctor should ask himself what he is going to do about this matter. Shall he remain silent in view of the galling criticism which has been heaped on this state; or shall the members of the profession rise up to a man and demand of the Governor a board which will no longer disgrace our state by its inefficiency?

Every good citizen should understand that the present conditions are due to the deliberate negligence of the present Governor. If he has sufficient confidence in the present Board to retain them in office, he should show that confidence by reappointing them; but if they are not desirable for reappointment, he should reorganize the Board as he has so frequently promised to do.

Very truly, CARL E. BLACK.

SECRETARIES, PROGRAM COMMITTEES AND MEMBERS OF THE ILLINOIS STATE MEDICAL SOCIETY

At the meeting of the Committee on Public Policy, held recently, the Secretary was instructed to bring to your attention the adoption of the following resolution by the last House of Delegates:

Resolved, That the Committee on Public Policy and the Secretary be a special committee to arrange a list of speakers on public health and social hygiene, and that so far as possible this subject be discussed by a member of the profession in every city, village and school house of the state, and that the county societies be interested so far as possible in this work.

The committee desires to know just what arrangements must be made in every county of the state to carry out the provisions of the above resolu-

tion. Will you, therefore, discuss this matter at your meetings, formulate about what you want, and communicate the same to me? The supply of speakers on the above-mentioned subjects is very limited, and it is the opinion of the committee that some member of the profession in your county may be able to do this work satisfactorily.

The committee further desires to state that this work should be classified as follows: viz., speakers addressing county medical societies and social clubs jointly, those that should address school children of proper ages of boys and girls respectively, and those that should address teachers.

Give this your earliest attention and send your instructions and wishes to me.

E. W. Weis, M.D., Secretary.

SULPHUR SPRINGS SANITARIUM FINANCIALLY SOUND

Peoria, Ill., Oct. 12, 1912.

To the Editor:—I note in the October issue of the Illinois Medical Journal, among the news items, mention of the fact that a receiver was asked for the Sulphur Springs Sanitarium, of which I am superintendent. I wish you would kindly give me sufficient space to state the facts in the case.

The instigator of the trouble is a discharged employee, who has since acquired one thousand dollars worth of stock. He induced another stockholder, owning a like amount, to join him in an effort to force us to purchase the stock. His plans failing, he trumped up some erroneous charges in an endeavor to force the issue. However, I have a controlling interest, and I was not born yesterday. When forty-seven thousand dollars out of forty-nine thousand issued stock is perfectly satisfied and the business growing daily, there is not much call for a receiver or anything else disagreeable. The proceeding is merely a puerile attempt at blackmail. Thanking you in advance for this mention, I am,

Yours fraternally,

E. W. Oliver.

Scientific Editorial

NEW AND NONOFFICIAL REMEDIES

Since publication of New and Nonofficial Remedies, 1912, and in addition to those previously reported, the following articles have been accepted by the Council on Pharmacy and Chemistry of the American Medical Association for inclusion with "New and Nonofficial Remedies."

Neosalvarsan is a mixture of sodium 3-diamino-4-dihydroxy-1-arsenobenzene-methanal-sulphoxylate, $NH_2.OH.C_6H_3.As:As.C_6H_3.OH.NH(CH_2O)OSNa$), with inert inorganic salts. The arsenic content of three parts of neosalvarsan is approximately equal to two parts of salvarsan. Neosalvarsan is supplied in sealed tubes containing, respec-

tively, 0.15 gm. (2 3-10 grains), 0.3 gm. (4 6-10 grains), 0.45 gm. (6 9-10 grains), 0.60 gm. (9 3-10 grains), 0.75 gm. (11 6-10 grains), 0.9 gm. (13 9-10 grains). It is readily soluble in water-forming solutions, which are neutral to litmus and very unstable. The action and uses are the same as those of salvarsan. The average single dose for man is 0.75 gm. (12 grains). It may be administered by intramuscular or, preferably, by intravenous injection. For intravenous injection 25 c.c. freshly distilled water for each 0.15 gm. is to be used. For intramuscular injection 3 c.c. of water should be used for each 0.15 gm. neosalvarsan, this yielding an approximately isotonic solution. Victor Koechl & Co., New York (*Jour. A. M. A.*, Sept. 14, 1912, p. 879).

Saloquinine, the salicylic ester of quinine, is described in New and Nonofficial Remedies, 1912. The product as sold by Merck & Co., New York, has also been admitted to N. N. R. (*Jour. A. M. A.*, Sept. 14, 1912, p. 879).

Articles accepted for N. N. R. Appendix:

Menthol-Iodol is a mixture of iodol 99 parts and menthol 1 part. Kalle & Co., New York (*Jour. A. M. A.*, Sept. 14, 1912, p. 879).

CHICAGO, Oct. 1, 1912.

To the Editor:—Since September 1, the following articles have been accepted for inclusion with New and Nonofficial Remedies:

Neosalvarsan (Victor Koechl & Co.).

Bismuth Betanaphtholate (Merck & Co.).

Staphylo-Strepto-Bacterin Mixed (H. K. Mulford Co.).

Anti-Plague Bacterin (H. K. Mulford Co.).

Slee's Glycerinated Vaccine Virus (Abbott Alkaloidal Co.).

Detre Differential Diagnostic Test (Cutter Laboratory).

Tuberculin O. T. (Dilution) Von Pirquet's Reaction (Cutter Laboratory).

Diphtheria Antitoxin. (Cutter Laboratory).

Yours truly, W. A. PUCKNER, *Secretary.*

IN THE AGE OF SCIENCE

"Come over and play with my little boy, sonny," called the pleasant-faced new neighbor to the solemn faced urchin on the fence between the two houses.

"Is your little boy ailing from anything?" came the child's earnest question.

"No, indeed, sonny. Why?"

" 'Cause I've had my tonsils taken out, an' my adenoids removed, an' my appendix cut out, an' I've been vaccinated, an' serumized for typhoid, an' spinal meningitis, an' had antitoxin injected, an' I do hope I won't have anything done to me this year, so's for a while I can have a bit o' fun!"

COUNTY AND DISTRICT SOCIETIES

CHAMPAIGN COUNTY

Dr. George A. Zeller of the Peoria State Hospital addressed this meeting held in September, at Champaign, on what we who heard him have since considered the sensational subject of pellagra. His description of the manifestations of pellagra made excellent pictures of the disease even without the clear photographs—numbers of which were shown. Dr. Zeller asked if we were aware that our immunity of to-day may be changed to a feeling of alarm to-morrow, and stated that he has reason to believe that a spread of pellagra is imminent.

Pellagra has been recognized since 1735, and the theory of its origin has in every epidemic been ascribed to corn although the reality of this has never been proven. It now invades forty states of the Union, with altogether perhaps 7,000 cases, and has a mortality of 50 per cent. There are many cases in Illinois—250 in the Peoria State Hospital. It is a disease of striking anomalies, yet has sufficient uniformity in its manifestations to establish a disease entity. It may affect people in any walk of life; is not contagious; is associated with insanity, but whether it precedes or follows the mental condition is not known. Late investigations have been along the line of a possible protozoan involvement of the intestinal tract of persons afflicted. At this point Dr. Zeller made a reference to the work that was done a few years ago in Dr. Burrill's laboratory at the University of Illinois, on diseases of the corn plant. A fuller description of this work and also that of Professor Forbes, State Entomologist, on black flies and buffalo gnats as possible carriers of pellagra is here added: "After the peculiar malady affecting several persons in the Bartonville Hospital was recognized as pellagra, the United States Surgeon General sent from Washington a medical man to make examination of the situation and of the disease."

In the discussion following Dr. Zeller's talk, Dr. Davis reported a case of pellagra he had charge of in Champaign a few years ago which showed all the characteristic marks.

Dr. Burrill talked on the efforts at present being made by the alumni of the University of Illinois to buy the stock of the College of Physicians and Surgeons in Chicago, for presentation to the University. A committee, Drs. Burrill, Mason and Lyons, was appointed to prepare a report on this question for the next meeting.

Dr. E. G. Boyd of Ludlow, was elected to membership in the society. Nineteen members were present.

CRAWFORD COUNTY

The regular meeting of the Crawford County Medical Society was held Sept. 12, 1912, in the Carnegie Library, Robinson, Ill., at 2 o'clock.

The meeting was called to order by the president, H. N. Rafferty, and the minutes of the previous meeting were read and adopted. The following members of the society were present: Drs. Martin, Price, T. N. Rafferty, Kirk, Firebaugh, Carlisle, Wilson, Dunham, Davis, Brooks, Mitchell, Henry, H. N. Rafferty, Illyes, and Lowe.

The name of Dr. Geo. F. Smith of West York was proposed for membership upon his request and an application blank was sent to Dr. Smith.

The scientific program was then taken up and Dr. Firebaugh gave a very able lecture on "Wounds," dealing especially with wounds of the head and face, also demonstrating a wound of the scalp upon a patient. Upon motion seconded and carried the paper was received by the society for discussion which was led by Dr. Martin and participated in by the entire society.

This was followed by a paper, "Cholelithiasis with a Report of Case," by Dr. Brooks. The paper was very interesting and instructive, dealing with the subject especially from a surgical standpoint. The case reported was a case of cholelithiasis closely resembling intestinal obstruction and was differentiated by an exploratory incision. This case was one of unusual interest and a brief report will be given. The patient's previous history was negative, mother of six children, aged 39 years. First complained of intense abdominal pain, with slight radiation to right shoulder, gall-stone colic was suspected and usual treatment instituted. Case went on for two days with slight change with no stools and some vomiting with a possible fecal odor.

She was prepared for operation on the third day and just previous to starting the anesthetic she again vomited with a decided fecal odor. The operation was performed, the gall-bladder was found necrosed, adhesions formed and a large gall-stone removed. The patient made a good recovery from the anesthetic, bowels moved four times during the next eight or ten hours, but patient died about ten or twelve hours after the operation probably from shock.

The paper, upon motion seconded and carried, was received by the society for discussion. This was led by Dr. Henry and a free discussion by the society followed.

A case of iritis was then demonstrated and discussed by Dr. Firebaugh. Adjourned.

A. LYMAN LOWE, Secretary.

FOX RIVER VALLEY MEDICAL ASSOCIATION

The ninety-fourth semi-annual meeting of the Fox River Valley Medical Association was called to order by President Schurmeier, May 14, 1912, at 10:30 a. m. with forty-six members present. The minutes of the previous meeting, held in Geneva February, 1912, were read and so adopted. Dr. McDonald moved, seconded by Dr. Mann, that the courtesies of the society be extended to Drs. Lord of Plano and Howell of Elgin. Carried. Report of standing committees none. Report of special committee as follows:

To the Officers and Members of the Fox River Valley Medical Association:

Gentlemen.—Your committee appointed to investigate the matter of issuing a bulletin in the name of the association have to report that such a publication can be issued as a four-page folder, with 36-point type caption, filled with 8-point type solid matter, all manuscript copy to be submitted to printer typewritten, at a cost of about $8.75 per hundred copies. This cost might be reduced by the sale of advertising space, but estimate on that point cannot be given. The committee will be willing to assume the responsibility of getting out two or three issues, until such a time as the society makes other plans.

Dr. MacDonald moved, seconded by Dr. Sherman, that the report be accepted, and placed on the files of the association. Carried.

There was considerable discussion as to the feasibility of publishing such a bulletin and whether the money spent in this way could not be used in a more profitable way for the society. A rising vote was taken with the result that eighteen of those present voted in favor of such a publication as the committee recommended and that the committee be empowered to proceed to issue the bulletin and authorize the secretary to issue an order on the treasurer for the necessary money. There were three dissenting votes.

Dr. MacDonald suggested that Article II of the By-Laws be changed so that the program will alternate, instead of the surgical papers being given in the morning and the medical in the afternoon as heretofore. It is hoped by such a change that a fuller attendance will be had during the entire session, as it is now those interested surgically will remain only for the forenoon session and those medically for the afternoon program. The matter was placed in the hands of the following committee, to report at our next meeting in November. Committee: Dr. MacDonald, Aurora; Dr. Bishop, St. Charles; Dr. Schneider, Elgin.

Dr. Scott of Oak Park being unable to attend, Dr. Brennecke opened the program by a paper on "Intestinal Obstruction with Meckel's Diverticulum."

INTESTINAL OBSTRUCTION WITH MECKEL'S DIVERTICULUM

H. A. Brennecke, M.D.
AURORA, ILL.

Because of its importance as a cause of abdominal trouble, it is worth while to review our knowledge of it.

First reported by Rush in 1701, but John Frederick Meckel first called general attention to its presence, etc.

Origin: A persistence of the omphalo-mesenteric duct (yolk stock) in form varying from a patent tube at the umbilicus to a blind tube hanging free in the abdomen or attached by a fibrous band (terminal ligament) to the umbilicus, mesentery or other abdominal organs. In location anywhere in the intestinal tract from the pylorus to the ileocecal valve but usually in the lower one-fourth of the ileum, this depending on the subsequent retardation in the development of one or the other of the limbs of the umbilical flexure. On the intestinal loop the position is generally opposite the mesenteric attachment but may be on the same side or even arise between the layers of the mesentery. Its frequency is said to be about 2 per cent.

As a cause of intestinal obstruction Leichtenstern found in a series of 1,134 cases of obstruction that 6 per cent. were caused by Meckel's diverticulum, also Duchanssoy and Brinton in 991 cases found it a cause in about 6 per cent.

MECHANISM

1. Obstruction from kinking due to traction by an attached diverticulum.

2. May cause a volvulus of small intestines by twisting bowel on its long axis at front of origin of the diverticulum.

3. Chronic inflammation of the diverticulum and adjacent parts may cause a cicatricial narrowing of the bowel lumen.

4. An inversion into the bowel causing a mechanical obstruction or being drawn further into the lumen and causing an intussusception.

5. An attached diverticulum may act as a band around which the bowel becomes twisted.

6. A prolapse of small intestine through an umbilical fecal fistula or a prolapse of a Meckel's diverticulum into a hernia sac.

Symptoms may be summarized as follows: Acute colicky pains, usually in neighborhood of umbilicus, followed by vomiting. Often blood is passed in the stools. If intussusception, you may feel the sausage-shaped mass. Peristaltic waves are often noted. In the beginning fever is not present and the patient may be in good condition for a number of days in spite of severe onset. Mortality very high. A. E. Halstead in fifty-seven cases with obstruction which were operated on had a mortality of 59.1 per cent. H. Tyrell Gray in a table of forty cases, a mortality of 60 per cent. High mortality is due partly to late operation, the condition not being recognized, and because the pathology produced by Meckel's diverticulum is very extensive. The following cases were reported in the original paper:

Case 1.—Miss L., aged 28 years. History as follows: Usual diseases of childhood. For many months has had crampy pains in abdomen. For past six months complained of much pain in left side of abdomen; never passed any blood in stools. Physical examination shows patient in fair condition, somewhat anemic, but heart, lungs and kidneys negative. Umbilicus much retracted. On opening abdomen we found the sigmoid drawn over into the right side of the pelvis. The cecum was high up under the liver and in looking for the appendix found a Meckel's diverticulum about eight inches above the ileocecal valve. This was filled with gas and fecal matter and was constricted at the bowel end so much as to act as a valve. The diverticulum removed, the bowel opening closed by two rows of sutures; appendix normal but removed. Uneventful recovery.

Case 2.—F. D., male, aged 6 years. Previous health good. The day before I was called he had severe abdominal cramps which were laid to eating green apples. Pain continued through the night and the following morning I was called. No history of previous attacks; pulse 140 to 150, weak and thready; temperature normal. Heart and lungs normal. Abdomen: In region of bladder and resembling a distended bladder was a large swelling, dull on percussion and moderately tender. A diagnosis of volvulus made and operation advised but postponed until following day because of absence of father. At the time of operation the patient's condition was very bad. On opening abdomen found a volvulus involving two or three inches of the cecum and about thirty inches of small intestine and at lower end of volvulus was a Meckel's diverticulum about six inches long. Volvulus was resected, the colon closed and a lateral anastomosis by the suture method done. Patient died in twelve hours.

Case 3.—L., male, aged 5 years. History of having had similar attack before in which he passed blood. Present attack began with severe pain in abdomen lasting several hours. Following day had another attack of abdominal pain after which bowels did not move. On the third day he had fecal vomiting. A diagnosis of intussusception was made and operation revealed a mass high up in the right upper quadrant of abdomen which proved to be a Meckel's diverticulum which had become invaginated and then caused an intussusception of about five inches of small gut. This was resected and an end-to-end anastomosis with a Murphy button was made. Patient passed button on fifth day, and left hospital on eleventh day.

Case 4.—Baby E., male, aged 9 months. Doctor called because of severe abdominal pain and passage of bloody mucus. Examination revealed peristaltic waves and a sausage-shaped tumor mass in left side. At time of operation patient was in bad condition. Incision revealed an intussusception of about three inches of the ileum and twenty inches of colon. This could not be reduced, so excision and an end-to-end anastomosis performed. Examination of specimen revealed in the intussusception an appendix three inches long and near it a cupping of intestinal wall which was taken to be a very blunt diverticulum. Died soon afterward.

A review of these cases reveals the fact that each one is different. Case 1 simulated an appendix both in symptomatology and also at operation. Case 2, the diverticulum caused a volvulus. Case 3, the diverticulum had been invaginated and then caused an intussusception of small intestine. Case 4 is similar to Case 3 except that we have an involvement of the large bowel.

DISCUSSION

Dr. Peltin, Elgin: I have not had the experience along this line that Dr. Brennecke has had. I reported a case in the paper I read at the last meeting in which I made a plea for larger incisions. That patient made a nice recovery. I wish to congratulate the writer upon this very valuable and interesting paper.

ECLAMPSIA, DIAGNOSIS AND TREATMENT

M. E. Marion, M.D.
BIG ROCK, ILL.

Eclampsia, or toxemia of pregnancy, is an acute disease occurring in the pregnant or puerperal woman. The condition being dependent primarily on the development of a fetus. It manifests itself by clonic and tonic convulsions with loss of consciousness followed by more or less prolonged coma and renal symptoms.

Before taking up the diagnosis and treatment of eclampsia, I would like to mention the three theories as to its etiology.

1. That it is a general toxemia due to increased metabolism and a decreased elimination caused by the presence and demands of the fetus on the maternal organism.

2. The placental theory of Schmorl, who discovered a cellular element in the pulmonary circulation and maintains that by mechanical means not known, syncytial cells enter maternal circulation and that in their albumin a toxin is contained which is inimical to the mother and which the circulation endeavors to combat by an antitoxin.

3. The Italian theory that the condition is due to an abnormality of the glands of internal secretion, especially the thyroid.

Diagnosis.—Since the occurrence of eclampsia convulsions depends on the susceptibility of the nervous system, an examination of the urine alone is not sufficient to warrant a diagnosis of toxemia. The state of the nervous system should be examined. We may find exaggerated reflexes, neuralgic pains, pernicious vomiting, epigastric crisis, disturbance of vision, etc.

The circulatory system is a prominent diagnostic feature. The tension of the pulse is of two kinds; the heavy, firm, constantly high tensioned pulse which is readily recognized, and the more dangerous variety because it is not so often recognized, the rapid pulse whose tension is not at first raised but which develops quickly upon slight disturbances.

High blood-pressure precedes albuminuria and all the signs of an impending attack of eclampsia. The normal blood-pressure in non-pregnant women who show no signs of kidney and cardiac lesions averages about 112 mm.

The normal blood-pressure in normal pregnant women who present no evidence of toxemia is about 118 mm. This holds true for the first seven and one-half months. At this time it rises until two weeks before term when it reaches 124 mm. In the pressure of toxemia, the blood-pressure is greatly increased, in many cases 142 mm. being the lowest. The high pressure recorded in a woman without convulsions was 192 mm. The highest in an eclamptic, was over 320 mm.

Upon the rupture of membranes in labor there is an immediate fall, from 60 to 90 mm. which is only temporary but is attended with great relief in headache and epigastric pain. After the fetus is delivered there is a second fall of from 60 to 90 mm. This fall is only temporary and unless the patient has bled considerably the pressure returns within fifteen to twenty minutes.

Hirst states that a blood-pressure of below 125 mm. can be disregarded, a pressure of from 125 to 150 mm. needs careful watching and moderate eliminative treatment and will in all probability, if it shows a tendency to climb higher, require induction of premature labor.

C. S. Bacon of Chicago calls the pre-eclamptic stage the eclamptogenic toxemia of pregnancy and states that the convulsions are simply a culminating symptom. He gives the other most important symptoms as edema, increased blood-pressure, albumin and casts, diminished urinary excretion and general toxic symptoms. The frequency of this eclamptogenic toxemia is probably ten to twenty times as great as frequency of the convulsions. In the diagnosis of eclampsia it is extremely important to estimate the rate and total amount of elimination of urine during twenty-four hours. While the pregnant woman stores up nitrogen to prepare her for the muscular trial of labor, the fact remains that a persistently low excretion of urea is abnormal.

A large quantity of serum albumin with granular, fatty or blood-casts indicates that the kidney epithelia are badly damaged. The presence of albumin and casts with a low percentage of urea in a pregnant woman, therefore, is a danger signal.

Olshausen points out that severe epigastric pain is a frequent precursor of the seizure and a sign to which more attention should be paid.

I believe that we are all familiar with the eclamptic convulsion, its appearance and its diagnosis, so that it will not be necessary to dwell longer on the subject of diagnosis.

Treatment.—The treatment is divided into preventive and curative. Prophylactic treatment consists of putting the patient to bed and restricting the diet, giving milk and water in large quantities. If this does not serve to clear up the symptoms this treatment is followed by a brisk purge of epsom salts daily and

stimulation of the skin by means of a daily hot pack or sweat bath. If under this treatment the symptoms disappear, the albumin becomes less and the urea increases in amount, the outlook may be considered good. On the other hand, if the albumin steadily increases and the urea elimination decreases while the subjective symptoms remain the same, the prognosis becomes ominous and the appearance of sleep and coma or eclampsia can only be avoided by the induction of premature labor.

It is well to mention here the fact that we should all insist on seeing our prospective patient and examining the urine at least every two months during pregnancy and every two weeks previous to the climacterium.

Under curative treatment comes the discussion and the variance of authorities as to the best manner of caring for the convulsions and marked toxemia. Curative treatment may be subdivided into the medical and surgical treatment. Under medical treatment, B. C. Hurst gives a much discussed plan whereby the mortality was reduced to below 10 per cent.

1. Lavage of colon and stomach, castor or croton oil by stomach tube and later, if patient can swallow, epsom salts. Patient is placed in sweat cabinet for thirty minutes every four hours.

2. Hypodermoclysis after first sweat, 1 quart in colon.

3. Venesection; if the blood-pressure is over 180, 16 ounces of blood are withdrawn.

4. Medication. M: xv fl. ext. veratrum by hypodermic injection. Later gr. .01 nitroglycerin every four hours. Chloral per rectum and chloroform by inhalation. Parathyroid extract gr. 0.25 every four hours is of value.

5. Obstetric treatment. Nothing is to be done except puncture the membrane. Any form of accouchment forcé adds to the risks and increases the mortality. After puncture of membranes and active eliminative treatment an easy delivery is the rule in eight hours.

According to Rouvier and Laffont recovery is much more rapid and complete when eclampsia is treated by morphin. Gr. 0.25 is given every three or four hours supplemented by inhalations of chloroform and copious rinsing out of the stomach and intestines.

Stroganoff outlines a treatment consisting of absolute quiet, avoiding all irritations to kidney regions; supporting activity of skin by keeping the patient warm; free use of oxygen and fresh air; maintaining heart by injecting warm normal salt solution and giving milk or tea with chloral either by mouth or per rectum. If pulse is from 112 to 120 he gives digitalis or digalen and bleeds only in pulmonary edema.

Fraenkel however believes that speedy delivery is a prime essential if the physician is capable of performing the necessary operation. This should be done at once. If circumstances do not permit this, then the treatment of Stroganoff should be used.

Surgical treatment. In the majority of cases speedy delivery after onset of disease and labor. Delivery may be in most cases rapidly accomplished by the manual method of dilation. Child should then be delivered by forceps or version. If, however, labor has not set in and the cervical canal is intact it becomes necessary to determine whether it is more advisable to adopt expectant treatment or to attempt to hasten delivery. The concensus of opinion seems to be in favor of a rapid delivery.

Vaginal cesarean section is the ideal operation for rapid evacuation of the uterus in the hands of a specialist. The abdominal method gives good results for the infant but has a high maternal mortality.

Rapid delivery does not constitute the only method of treatment, as a certain number of women die after labor.

In the attempt to stimulate the excretion of toxins after delivery, bleeding is excellent to remove a certain amount of toxic material directly from the body along with the free injection of fluids and the use of normal salt. During the past year much has been done regarding decapsulation of the kidneys for the

most drastic cases. It is claimed that this has a powerful diuretic action on the most severe cases.

In summing up the treatment of eclampsia, it is essential to distinguish between cases in the hands of a specialist and those of a general practitioner. We all agree that immediate delivery gives the best chances for both mother and child in eclampsia, but only in the hands of an experienced surgically trained obstetrician.

Vaginal cesarean section is the best method of delivery in the hands of a surgeon. The recognized treatment, therefore, consists in controlling the convulsions by moderate doses of morphin and chloral and the administration of chloroform. Veratrum viride may be given, venesection practiced, but patient not disturbed by any cathartics or sweats. The bag of waters should be ruptured and a colpeurynter inserted. As soon as the cervix is effaced and so dilated an easy delivery may be accomplished under ether anesthesia.

DISCUSSION

Dr. Peterson, Dundee: We all accept what is taught in school. I think if we would use our own judgment a little more often we would get different opinions. I have had a few cases of eclampsia. The very first one was my second case of delivery in practice. That woman died. What I want to say now is this: the urine may be examined and no albumin found or the urine may not be examined and contain a large amount of albumin. Eclampsia is a case of toxemia. Albright in treating 166 cases, 100 of them women and sixty-six children, 98 per cent. of which died, found in post-mortem examinations that all had diseased livers and diseased kidneys. So it is not only the kidneys that are to be considered. They had all been treated with great care. The deliveries were slow. The most important thing was to use eliminants to relieve the toxemia. This was done by elimination through the emunctory organs. They found when they gave eliminants free of chlorids there was marked improvement, because they found that chlorin could not be eliminated by the kidneys. I have treated similar cases where the kidneys could not remove the chlorin. I gave ammonium chlorid and at once they became worse, but as soon as I gave sodium they improved. Instead of giving chlorids give elaterin or anything else which would relieve the toxic condition. Avoid the chlorids. I say this, the most important thing is to examine to see whether the liver and kidneys both are affected. I think it would be right to have a quick delivery only in exceptional cases, because when the liver and kidneys are sick and you empty the uterus at once, there comes a back pressure from the uterus to the liver. In such cases a slow delivery would be the proper thing. One physician found that a patient suffering from this sort of toxemia was saved by the amputation of the breasts. The toxemia might be produced by the breasts, for we know the close relation between the breasts and the uterus.

The circulation which goes from the uterus into the liver is greatly relieved by free elimination by sweating, purgation, and by rest and milk diet. I think many cases would not be lost if this plan were followed out. The main point I consider is to especially examine the liver and the circulation and see where the relief is mostly needed.

Dr. Abbott, Elgin: I have at present a patient who is seven months in pregnancy. A week ago in examining the urine I found trouble. There was over 1 per cent. of albumin. I placed her on a milk diet and much water. I used the phosphate of soda and Hunyadi Janos water. I examined another specimen yesterday and found only the slightest trace of albumin. This patient is a primipara, married rather late in life and I have anticipated trouble from the very first. However, she is free from all symptoms now.

I had one case of eclampsia which resulted fatally for the mother. That was in a young woman of French descent who had acute Bright's disease during her younger days following some febrile disease. She also was a bleeder and at one time I operated for hemorrhoids by the clamp and cautery method. I was

called in soon after and had a great deal of trouble controlling the hemorrhage. She was six months in pregnancy before I knew anything about her case. Upon making an examination of the urine at that time I found it negative. Following along about seven months she was told to bring in a specimen every two weeks, when it was found to contain a large per cent. of albumin. She was placed on milk diet and an eliminant. To make it short I will say that she got better and then grew worse. The specimen was not brought at the time I expected it and then I found the albumin had again increased; there was much edema of the limbs, followed shortly by a toxic frontal headache. This was about 11 o'clock. I put her on eliminative treatment, she got better and at 4 o'clock in the afternoon I was told she was all right and that I need not come. In fifteen minutes after that I was called to come in a hurry. She was in an eclamptic convulsion and was removed to the hospital. She was then eight months along. A forceps delivery was done but there was no stopping of the convulsions. She was put to bed and given the ordinary treatment, such as application of heat, hypodermoclysis and an eliminant (elaterium) given. She lived eighteen hours. During this time the kidneys secreted only about 3 ounces and to all appearances almost solid albumin. This is the only fatal case and shows what a terrific weight was placed on the organs of the mother, supporting two babies each weighing 8 pounds, besides carrying on the functions of her own body. I have found as the texts state, the later the eclampsia comes on the less they are apt to be fatal. I do not know that there is anything new to add.

Dr. Hawley, Chicago: In cases of eclampsia you examine the fundus of the eye and you come to the conclusion, albuminuric retinitis, but bear in mind there are other toxemias producing similar effects. Autointoxication frequently produces the same condition of the fundus as albuminuric retinitis, and of course there are other toxemias producing conditions of the fundus similar to albuminuric retinitis. In albuminuric retinitis we are very much more apt to have hemorrhages.

Dr. Brennecke, Aurora: I would like to ask Dr. Hawley if you get an albuminuric retinitis, or a retinitis of the autointoxication type in a case of pregnancy, how you are going to distinguish.

Dr. Hawley: That is quite difficult unless you are accustomed to recognizing the appearance of the macula in cases of autointoxication, but one who is accustomed to it can hardly make a mistake. I had a patient come to me with this condition; I made the diagnosis that it was not albuminuric retinitis but a very similar condition; at the time, however, I did not have the suspicion that it was autointoxication. After a time the patient left me and went to someone else, but returned again after six months. The only way would be to eliminate as far as you can abdominal toxemias.

Dr. Bell, Elgin: I have met with a number of cases in my practice and have resorted to active catharsis with such agents as produce a large watery stool. I consider elaterium the best hydragogue cathartic. I use normal salt enemata freely, but do not favor morphin or opiates of any kind because of their action on the emunctories. I believe in early interference in all cases. Even early interference will not save them all. In one case, complicated with placenta prævia, rapid delivery was done, the patient dying soon after.

Dr. Brennecke: The subject has been exhaustively treated by the writer, but I have noted that these cases seem to run in groups. Early urinalysis is advisable although not always reliable. I have noted instances where the day before delivery the urine was normal and the day following uremic convulsions. The patient developed acute yellow atrophy, blood in urine, liver decreased in size, leucin and tyrosin in urine. The patient recovered. Case number two developed thirty-six hours after delivery.

Another class of cases in which I found albuminuric retinitis, it being the only symptom present. I advised rapid delivery. This the patient refused. She went to full term uneventful, without, however, fully regaining her vision.

SIMPLE GOITER AND ITS TREATMENT

F. E. Bauer, M.D.
DUNDEE, ILL.

In taking for the subject of this paper, simple goiter, I full well realize that at least the majority of you have been consulted regarding the malady more times than the writer, but it seems to me that this class of patients is often neglected, for the simple reason that treatment for immediate relief is not necessary. Many times the patient will speak of a large neck when consulting a physician regarding some other trouble, when it may be unwise to prescribe a special treatment, and the growth is allowed to continue until pressure symptoms ensue. For this reason I have thought to at least review the condition in the hope that it might help us to urge on our patients the importance of early treatment before the dreaded symptoms arise.

Anatomy.—The thyroid gland bears much the resemblance, in structure, to other glandular organs and is classified together with the thymus, suprarenal capsule and spleen under the heading of ductless glands, it having no excretory duct when fully developed. It is situated at the upper part of the trachea and consists of two lateral lobes placed on each side of that tube and connected by a narrow transverse portion, the isthmus. Its anterior surface is covered by the sternohyoid, sternothyroid and omohoid muscles. Its lateral surfaces are in contact with the sheath of the common carotid artery. It extends as far back as the lower part of the pharynx, and on the left to the esophagus. It varies in weight from one to two ounces, is usually larger in the female and becomes slightly increased during menstruation. The isthmus connects the lower third of the two lateral lobes and usually covers the second and third rings of the trachea, although there may be variations.

The thyroid body is invested by a thin capsule of connective tissue which projects into its substance and imperfectly divides it into lobules of irregular form and size.

When the organ is cut into it is of a brownish-red color and is made up of closed vesicles containing a yellowish glairy fluid and separated from each other by intermediate connective tissue.

The gland is supplied from the internal mammary and from the superior and inferior thyroid arteries. The veins terminate in the left innominate and thyroid veins. The lymphatics are of large size and arise in the substance of the gland and are said to terminate in the internal jugular vein. The nerves are very small. They are derived from the pneumogastric and sympathetic.

I have gone into the anatomy to this extent as it is very important in the proper diagnosis and prognosis of the diseased gland. The physiology of the gland is not definitely known; therefore, I will not take up the many theories but will leave it for your discussion. Simple goiter is a chronic hypertrophy and hyperplasia of a portion or whole of the thyroid gland. It is of obscure origin, involving one or more of the structural tissues, and is subject to various degenerations.

Pathology.—The enlargement may occur in several ways. The true goiter consists in the enlargement of the old and formation of the new gland alveoli, while with these changes there is very frequently associated a greater or less amount of colloid degeneration. When there is now formation of gland tissue the growth has the character of an adenoma. The hyperplasia may occur diffusely so that the whole gland is more or less enlarged, or it may occur in the form of circumscribed nodules when the colloid degeneration is prominent so that the tumor has a gelatinous appearance which is colloid struma. Accumulation of fluid, blood or colloid in the old or new formed alveoli may lead to dilatation and atrophy of the walls of the alveoli so that cysts, sometimes of large size, are formed and in this way the cystic struma occur.

The blood-vessels may undergo marked dilatation so that we may have the formation of a cavernous angioma within the goiter. Frequently all these

varieties of lesions are present in the same goiter. The growth of the tumor may be very rapid and sometimes becomes very large, encroaching on neighboring parts, before symptoms occur. Death may result by pressure on the trachea, esophagus or large vessels. As to the etiology there is great variation of opinion. Some authors think locality and drinking water are contributing causes, it even being claimed by some that one having a goiter, on moving to a non-goiterous region, may have the growth arrested, but this is also disputed.

Symptomatology.—The thyroid is readily recognized and felt though the patient may complain of nothing but the disfigurement, excepting when the tumor is of sufficient size to cause symptoms of compression. The goiter develops very gradually and may vary in dimensions from the merest perceptible enlargement to a growth that overhangs the chest and greatly hinders the movement of the head. It may or may not be uniform in its development, and is often more enlarged on the right side than on the left. It is not infrequently observed to increase in size with each succeeding pregnancy, and during or after each menstrual period.

The tumor is painless, is not adherent to the overlying skin or to any of the neighboring bones, and rises and falls during the act of swallowing, moving with the larynx. The veins covering it are swollen and prominent. It interferes with respiration, causing dyspnea. Alteration and loss of voice may also ensue. Displacement and distortion of the trachea, the vessels and other cervical tissue may be produced. Large pendulous growths usually cause less serious discomfort than the small encircling tumors that extend downward into the thorax. Headache, somnolence and marked cerebral symptoms may occur, such as tetany and convulsions. The general health and nutrition seldom fail, unless inflammation and suppuration attack the goiter during the course of some infectious disease, as not infrequently happens; or in cases in which the thyroid function is abolished, leading to the profound nutritional and cerebral disorders of cretinism in children, or myxedema in adults. Sudden death may occur in rare cases, either from pressure on the vagi or from a severe hemorrhage. Auscultation often reveals a loud blowing murmur, especially marked in the vascular variety.

Diagnosis.—A tumor in close relation with the trachea and moving with it during the act of swallowing is an enlarged thyroid gland. The enlargement is usually greater on one side. The presence or absence of induration, fluctuation, palpitation or systolic thrill must be determined. If fluctuation is found it is in all probability a fibrocyst or simple goiter, or very rarely an abscess of the gland. If pulsation, thrill and murmur exist and the enlargement is unequal and varying, the associated symptoms usually will be found to declare it a case of exophthalmic goiter. If the pulsating enlargement is on the right side the possibility of its being either an innominate aneurism or a neurotic pulsation should be remembered. A solid enlargement is usually a simple goiter but may be due to an adenoma, cancer, tuberculosis or gumma of the gland.

Prognosis.—The prognosis, I believe we can say guardedly, is favorable as to cure, although this is contrary to most authors. The course is chronic.

Treatment.—Some authors lay great stress on prophylaxis, such as removal from goiterous districts and the drinking of boiled water only. The use of drugs is considered of very little value by most authors, and only surgical treatment is advised, but I believe this is not always necessary, and while I have not had so large an experience as they, I feel that the lack of success in the medical treatment is almost always due to not continuing treatment long enough. Since authors give such unsatisfactory treatment I will only give what I have used with not a few cases which have come under my observation.

I have made it a rule to tell my patients suffering with this disease that they will see little or no change in a month, that it will take from six to eight months to remove the enlargement. I have never recommended the use of tincture of iodin or any of the various applications externally. When in college the syrup of iodid of iron was recommended in doses of 7 to 10 drops. I used this on one

case for a while, but as you all know, this is very liable to cause gastric disturbances. With this patient, about the time the enlargement began to decrease, gastric symptoms appeared. It having done well for the length of time used I tried to get some prescription using the drug that would lessen the gastric disturbances. I used the simple syrup which did better, but in using the lactated pepsin I could give it in even larger than half teaspoonful doses, three times daily, after each meal.

I also used a pill of creosotide, made by Nelson-Baker Co. (containing 25 per cent. of its weight of iodin); this is a quarter grain pill. I start this treatment with one pill after each meal for 5 days, then two after each meal.

With one or other of these methods I have but one case that did not improve as long as the treatment was continued. This case was a young man 22 years old, on whom I tried the syrup of the iodid of iron for about three months, with but little result, after which I used the violet ray and *x*-ray, giving three treatments per week, using the *x*-ray once in five treatments, and in three months' time the gland was of normal size and has continued so now nearly two years, with no untoward effects.

Another case was a woman, aged 50 years, with a very large goiter, so large that pressure symptoms were prominent. An eminent Chicago surgeon insisted on an operation. In my opinion the patient would not have survived the operation and I advised accordingly. I then placed her on syrup of iodid of iron. The pressure symptoms disappeared and the gland was reduced in size to 11.5 inches when gastric symptoms occurred. The treatment was discontinued and the gland has since increased in size. I am hoping soon to begin the use of the violet and *x*-ray treatment and am very anxious to see the result on this case because of the size and long standing of the goiter.

DISCUSSION

Dr. Petterson: I have had a few cases which gave good success with tincture of iodin and carbolic acid two or three times a week over a period of two months. Usually the tumor would get smaller. Give two drops of carbolic acid and ten to fifteen drops of the tincture, making deep injections. In some cases there would be a reduction of the tumor though it would not entirely disappear.

Dr. Jenks: I do not know that I have anything new to add regarding the treatment of goiter. In fact I believe there is no definite treatment except surgical treatment that can be depended upon for the removal of goiter. If you will recall the literature you will remember that there is scarcely a thing mentioned in our physiologies that has not been tried in the treatment of goiter and all of them, or nearly all, have been credited with affecting a reduction in the size of the goiter. At the same time all of you know that many goiters have been removed by various procedures which could not have any effect on the goiter, for instance the laying on of hands and various other things that have been used. It is a fact that the treatment (medical) of goiter and hyperthyroidism is in a very unsatisfactory stage. I have read some years ago a quotation from the elder Kocher on the use of iodin and the iodids. The iodids have been used very largely of course for many years in the treatment of goiters, and Kocher found that by using iodids for removing the tumor or reducing the size, very frequently resulted in hyperthyroidism. I have had the same result repeatedly by the use of iodids in trying to reduce the size of the goiters and I believe with Kocher that the iodids ought to be used with a great deal of caution, for in some cases the first thing you know the patient will not only have the tumor but a very marked hyperthyroidism in addition.

Dr. Tobin: The first thing that was used in the treatment of goiter was iodin and the more we experiment we still find that we are brought back to the fact that as yet we have but one drug, iodin, that has proven of value in the treatment of goiter. While Dr. Jenks states that surgical treatment is the only radical treatment, I feel that often we are just as much at sea in the surgical as we are in the medical treatment. I think many of the cases that get well in the medical treatment would get well just as they would under surgical treatment and vice

versa. Medical treatment as laid down consists in the altering of the internal secretion and our surgical treatment is the same. I think the only hope we have in the rational treatment of goiter is to come to a definite understanding as to what is the proper secretion of the gland.

Dr. Petterson: I want to say that in three patients with goiter I gave ammonium chlorid for liver trouble, and as soon as they took that the goiters began to increase in size. So be very careful.

Dr. McCawley : It seems to me in a discussion of this kind we should mention the effect of time. These patients usually are young girls that come to the office and you find they need general treatment. You give them general treatment and quite frequently ignore a thyroid. In the course of time the tumor has gone down and they are relieved of their symptoms. If you use a treatment of this kind give the credit where it belongs.

Dr. G. G. Schmitt: Outside of a few regions, like Switzerland, where the disease is prevalent in 30 to 40 per cent. of the population, the disease is more prevalent among the female sex and the development of the disease is principally between the ages of puberty until the end of the twentieth to twenty-fifth year. Of course it is more or less active until the menopause. I believe Dr. Bauer suggested that treatment ought to be begun rather early.

Dr. Rupert: Relative to the simple goiter, I am of the opinion that after all is said, a simple goiter should be left alone until it interferes with respiration and when it does, then I believe it is a surgical case. In looking over the literature we find certain parts of Switzerland where goiter is very prevalent, in fact it seems that a young lady there cannot get married unless she has goiter.

When a simple goiter gets to the stage where we have respiratory trouble I think we get but very little effect with the iodids. I believe that the treatment of many simple goiters is for a cosmetic reason rather than interference with respiration.

Dr. McCawley: Regarding the pressure symptoms, do you find that some of them complain of pressure symptoms when the gland is comparatively small?

Dr. Bauer: In regard to this question, I do not know that I have had that complaint very often except where the goiter is very large. The one I referred to in the young man 22 years old was undoubtedly on account of the size of the goiter. It was one of the largest I have ever seen. With the woman I mentioned I am sure it was on account of that. In that case I may say further that the right arm was practically paralyzed at the time of the operation. Another reason for taking up the medical treatment, while I believe there are cases where surgical treatment is the only relief, is that many times you cannot get the consent for a surgical operation.

Dr. W. H. Schwingel: Regarding the injections in cases of simple goiter, because I had repeatedly seen my professor use injections of alcohol and iodin and some carbolic acid, when I left school and had my first case of a simple goiter I thought this would be a sure cure. The patient I had in mind was 45 years of age with a large rather soft simple goiter. I started her with saturated solution of kalium iodid, ten drop doses, at the same time using alcoholic injections, ten minims once a week. About three or four weeks after starting this treatment (by the way the goiter had gone down very rapidly), I was called to the home of the patient and found her very much prostrated, with a pulse of about 140 to 150, very nervous and sweating very profusely. I took her to the hospital, called in Dr. B. but the rate of the pulse increased so rapidly that it was impossible to count it and in a few days she died. Now after death I examined the blood-vessels and found them very friable; you could crush them between the fingers. I think that served as a warning to be careful in using the injection method and internal iodid treatment. As our subject does not deal with exophthalmic goiters we will have to confine ourselves to the simple goiter. I believe that after twenty-five, or the developmental period, most of the simple goiters are irreducible no matter what method you use.

(To be continued in December issue.)

NEWS OF THE STATE

NEWS ITEMS

—Arrangements have been made for a large addition to St. Mary's Hospital at La Salle, Ill.

—Dr. Caroline Eaton, of Cambridge, Ill., was seriously injured by the explosion of a gasoline flat iron.

—Examinations were held at the Elgin State Hospital, October 12, for various state charitable institutions.

—Dr. William Barnes, of Decatur, has let the contract for a fire-proof building to house his valuable collection of lepidoptera.

—Dr. N. B. Ackley, of Colchester, has sold his practice to Dr. O. J. Ruth and will in a short time remove to Portland, Ore.

—The Association for the Prevention of Tuberculosis of Peoria is having lectures delivered in the public schools of that city.

—Dr. A. H. Kenniebrew, a colored physician of Jacksonville, suffered a broken scapula by being thrown from his buggy October 13.

—Dr. Clarence L. Wheaton has been appointed physician in charge of the male service at the Chicago Winfield Tuberculosis Sanitarium.

—The medical and surgical staff of Graham Hospital, Canton, elected the following officers: President, Dr. E. W. Regan; Secretary, Dr. Chas. N. Allison.

—Dr. H. H. Whitten, of Peoria, has bought the property and practice of Dr. Frederick Clark, of Batavia, Ill. He will alter the building and use it for a hospital.

—More than $55,000 was obtained October 15 for the children's charities of Chicago through the efforts of 3,700 young women, who sold nearly half a million tags.

—The surgical appliances and instruments of the late Dr. D. W. Burlingame, Elgin, have been presented by his widow and daughter to the Sherman and Elgin hospitals.

—Dr. V. P. Perisho has received notice of his appointment by the Illinois State Dental Society as a member of the committee on cooperation with the Illinois State Medical Society.

—Fulton County Medical Society elected the following officers at its meeting held in Canton, October 1: President, Dr. C. D. Snively, Ipava; Secretary-Treasurer, Dr. D. S. Ray, Cuba.

—The small-pox epidemic which raged at Ladd, Ill., last winter, cost Bureau County $1,650 for doctor's fees. Dr. J. J. Morgan, of Spring Valley, was allowed $1,200, and Dr. C. H. Dunn $450.

—Dr. Peter S. Weidman, of Edwardsville, met with a very painful accident when he missed his footing and was precipitated to the foot of a flight of stairs at the Leland Hotel, where he has been living for some time.

—Dr. William G. Todd, formerly of Elgin, but now of Chicago, celebrated his 91st birthday in that city. He was graduated with the first class from Rush Medical College, and is the only surviving member of that class.

—A warrant was issued against Oscar Evertz, of the Evertz School of Suggestion because he offered to give a patient fifteen lessons in suggestion for $45, telling her he could not cure her, but she could learn to cure herself.

—Dr. Flint Bondurant, of Cairo, was painfully injured while riding in an automobile; the machine ran into a rut in the road and the jar that followed threw him upward, his head striking one of the steel pieces in the top of the auto.

—The sanatorium of the Lake County Tuberculosis Institution near Waukegan, heretofore known as the Tent Colony, changed its designation, October 4, to the Lake Breeze Sanatorium. At present it has twenty-seven patients.

—Dr. R. S. Klein, formerly professor of histology and embryology at the Fordham University School of Medicine, New York, has been appointed director of the new research laboratories of the Hahnemann Medical College, Chicago.

—The Proctor Hospital Board of Peoria held a meeting recently. Besides the election of officers, plans for building a nurses' dormitory in the spring were discussed with animation, and the much-needed addition is now considered a certainty.

—A movement now being on foot to compel doctors to write their prescriptions in plain English, the Edwardsville *Intelligencer* suggests that it also would be a good thing to make the doctors tell us what is really the matter when we are sick.

—The physicians of Hamilton County recently enacted a new fee bill which supersedes the one in force since 1876. They found it necessary to make a statement concerning the charges in all the papers in the county. The fee bill is signed by twenty-two physicians.

—An ordinance has been submitted to the Council of Belvidere providing for the conversion into a tuberculosis sanatorium of the present city hospital, which is located on a tract of fourteen acres, three miles south of the city on the highest point in St. Clair County.

—Palmyra and Modesto physicians have gotten together and established a uniform scale of fees. Under the scale city visits will be $1.50; day visits in the country $1.50, plus fifty cents a mile; night visits in the country $1 extra. Other fees are advanced proportionately.

—Dr. John J. Stites, of Pontiac, a retired member of the medical profession, celebrated his 85th birthday anniversary September 25. He was born in Cincinnati, Ohio, and was a grandson of Major Benjamin Stites, an officer in the Revolutionary War. Dr. Stites has resided in Pontiac for forty-eight years.

—Dr. J. T. Gahm, of LeHarp, Ill., in August, had the misfortune of striking a buggy being trailed behind a load of furniture on the highway,

in which was seated a woman and two children. It was claimed that one of the children was badly hurt and it was awarded a judgment of $750 in the trial recently held at Macomb.

—The trustees of the Passavant Memorial Hospital Association of Jacksonville are arranging for a campaign to raise a fund of $50,000 or more for that institution. The work will begin October 17, with every prospect that that amount will be raised and a new building constructed to the west of the present structure.

—Dr. A. Ives, of Farmridge township, and Supervisor M. E. Hawley, of Vermilion township, each paid costs amounting to $30, and settled the case outside of court which was to have been given a hearing in a justice court in Tonica, and which involved only $16, the amount the doctor claims cost to have his machine repaired, as the result of a collision with the supervisor's machine.

—The twenty-fifth anniversary of the Scandinavian-American Medical Society, at Chicago, was celebrated October 10-11. On the first day Dr. William Jepson, Sioux City, Iowa, spoke on "Uncertain Phases of Surgery." Dr. A. J. Carlson, of the University of Chicago, spoke on "The Movement of the Empty Stomach and Its Relation to Hunger." The proceedings of this day were presided over by Dr. Ludvig Hektoen. The second evening was given over to a dinner and dance.

—A show calling itself the Parker, Dalton and Parker show, held forth at Cerro Gordo last week. Each night one of the "doctors" gives a medical talk and in the talk he makes a point of telling how highly moral and religious he and the rest of the company are. But on Sunday night one of the "doctors" was coming back from Decatur and he was so drunk he could not get into a seat by himself, and on Monday the other "doctor" was arrested in Decatur and locked up for being drunk and disorderly.

—The Illinois Association for the Prevention of Tuberculosis met in Springfield, October 19; this meeting being held in conjunction with that of the Illinois State Conference of Charities and Correction. The chief subject for discussion was "Antituberculosis Work in the Smaller Cities," and the speakers were Drs. J. W. Pettit, Ottawa, and George T. Palmer, Springfield. A part of the day was spent in visiting the dispensary and visiting nurse services of the Springfield Tuberculosis Association.

—The medical profession of Chicago entertained the group of physicians who are making a tour of the United States under the auspices of the German Central Committee for Physician's Study Travel. From Chicago they went to New York via Niagara Falls, Montreal and Boston. They were kept busy in Chicago by clinics, visits to hospitals and public buildings, a trip through the famous stock yards, automobile drives about the parks and boulevards, and various social functions including a Kommers and a banquet.

—A meeting of the surgical and medical staff of Graham Hospital, Canton, Ill., was held October 1, when the following officers were elected for the ensuing year: President, Dr. E. W. Reagan; Vice-President, Dr. J. E. Coleman; Secretary, Dr. C. N. Allison. Committees were appointed

as follows: Lectures to nurses, Drs. H. C. Putman, P. S. Scholes, J. E. Coleman, W. T. Zeigler and C. N. Allison. The staff is composed of Drs. W. T. Zeigler, J. E. Coleman, H. C. Putnam, C. A. Allison, E. W. Reagan and P. S. Scholes.

—Dr. Louis Rosenberg, 4820 Champlain Ave., Chicago, was arraigned before Municipal Judge Hopkins on a charge of obtaining money on false pretenses from George M. Klein, 4805 South State Street, and Miss Ida M. Schultz, 4758 So. Michigan Avenue. Klein said he paid Rosenberg $400 on the latter promising to fit him perfectly with eye-glasses, and also to admit him to membership in the Masonic Order. Miss Schultz charged that Dr. Rosenberg obtained $75 of her money and promised to cure a defect in her eye-sight.

—The Supreme Court is to review the damage suit of Mrs. Virginia V. Barton against Dr. George E. Southwick, of Cotton Hill, which was originally tried in the Sangamon County Circuit Court. The case was tried in June, 1911, by a jury and resulted in a verdict for $2,300 in favor of Mrs. Barton. On appeal to the Appellate Court this finding was reversed and the case now goes to the Supreme Court on a writ of certiorari. Mrs. Barton's suit against Dr. Southwick was based on the ground that she was given improper treatment. Prior to the determination of the litigation in the Circuit Court, Dr. Southwick filed a proceeding to recover pay for his services, and this was decided in his favor. When the appeal was taken to the Appellate Court Dr. Southwick's judgment was a bar to the damage suit, the question of his liability for alleged malpractice having been determined in his suit against Mrs. Barton. The Appellate Court took this view of the case and decided for the doctor.

—Sharp criticism of railway hospitals for employees conducted by railroad companies that compel employees to maintain them, was made by Dr. Frank Allport, of Chicago, at the afternoon session of the ninth annual meeting of the American Association of Railway Surgeons in the Hotel LaSalle. These men are compelled to accept membership in these hospitals of beneficiary associations, he asserted. The management is conducted practically by officials of the road, who, when placed on the defensive, seek refuge in the claim that they are responsible for any deficit. However, the membership fees are so arranged that there can be no deficit. The railway surgeon suffers through these associations. He suggested that a railroad medical fee bill be established by medical associations; that surgeons receive reasonable compensation from railroads, and that the profession discourage railway insurance associations. Dr. O. J. Fay, of Des Moines, discussed diagnosis. Several others spoke on technical problems.

—Dr. Carl E. Black recently addressed the High School students of Jacksonville on "The Profession of Medicine." Among other things he said:

> Every student should choose some calling to be held up as an ideal to be striven for. One may not reach the ideal, but a person is the better for having aimed high. If the student's aim is to make money, he should enter business. If fame

be the motive, law and engineering will give a much surer return than medicine. But if personal service to fellowmen be the idea, then medicine offers greater opportunities.

The study of Latin aids greatly in the mastery of medical terms. Modern medicine demands careful training in laboratory practice, for the intelligent doctor must be a skilled scientist. The most advanced work in this line is being done in Germany and France, and for this reason a reading knowledge of German and French is valuable. But the most important preparation of all is simply "to learn to study." To keep up with the rapid advancement of the profession requires constant study on the part of the busy practitioner.

No profession is more overcrowded than medicine. In Germany there is but one doctor to every 1,500 of the population. In this country there is a doctor to every 450 people. No other profession has so many poorly prepared members. The young doctor must expect, therefore, not only to meet honest competition from men properly prepared but the unfair methods of the advertising quack. Only merit of a high order can expect genuine success in medicine.

—Dr. W. A. Young, of Springfield, contributes the following important item to the Sangamon County Medical Society *Bulletin*:

KANSAS BLUE-SKY LAW

This very ingenuous statute is interesting from every angle to the laity in general and to the busy practitioner of medicine in particular. It has been in force in the progressive state of Kansas for several years to date and is proving a boom to the gullible doctor of medicine. Briefly stated, it provides for: A state bank commissioner and assistants, whose duty it is to examine all stocks, bonds, corporations and individuals offering such for sale. A fee of $2.50 is required of the applicant at the time of making application for a permit. In addition to this, the applicant must defray the expenses of such an investigation. The commissioner, who is an appointed state official, decides on the validity of the stocks or bonds and the character of the agent. In case a permit is granted, a sworn report of the condition of the stocks is required every six months. On account of lack of time, for investigation and business ability, the busy man ought to be vitally interested in having placed on the statute books of this state such a law against fraudulent promoters. Such a bill will be introduced at the next general assembly meeting and ought to have the active support of every member of the profession.

PERSONAL

Dr. Sheppard will open an office in Winnebago, Ill.

Dr. L. H. Beck will open an office in Plainfield, Ill.

Dr. A. A. McBryen, of Hillsboro, will remove to East St. Louis.

Dr. O. W. Allison, of Catlin, has resumed his practice in that village.

Dr. and Mrs. Wm. T. Gilman, Chicago, have returned from Europe.

Dr. A. W. Lindberg has purchased property and will practice at Hillsboro.

Dr. E. C. Burt, Jr., of Henry, Ill., will locate at Belvidere, Boone County.

Dr. J. C. Roberts, of Peoria, has recently returned from a sojourn abroad.

Dr. J. H. Bacon, of Peoria, is spending three months in London, England.

Dr. T. W. Gillespie, of Peoria, was operated on for appendicitis recently.

Dr. William G. Todd, Chicago, celebrated his 91st birthday, September 27.

Dr. James Ross, of Colorado Springs, Colo., will next month locate in Moline, Ill.

Dr. D. C. Harmison, of Havana, recently celebrated the fortieth anniversary of his practice.

Dr. W. V. Secker, of Tolono, has removed to Champaign, with offices in the Smith Building.

Dr. E. E. Barbour, of Peoria, is spending a month in post-graduate work in New York City.

Dr. W. A. Haskell, of Alton, was confined to his home the greater part of the last month by illness.

Dr. P. B. Magnuson, Chicago, has been appointed chief surgeon of the Chicago and Alton Railroad.

Dr. S. M. Blunk, of Chicago, has located in Virden, where he will take up the practice of his profession.

Dr. Hyde West, of Taylorville, has gone to Woodstock, where he is forming a partnership with Dr. J. E. Guy.

Dr. Charles W. Hunter, Oneida, who was operated on recently in Chicago, has returned home convalescent.

Dr. Flint Bondurant, Cairo, was seriously injured in an automobile accident near Mound City, September 23.

Dr. Frank W. Blatchford, Winnetka, was seriously injured October 2, by being run over on cranking his automobile.

Mr. G. Schmit, of Chicago, will contribute $1,000 toward the Beardstown Hospital. He formerly resided in that city.

Dr. Amos Sawyer, the oldest physician in Hillsboro, was recently stricken with paralysis and is in a serious condition.

Dr. Fenton B. Turck, Chicago, has removed to New York City, where he has purchased a home at 14 East Fifty-Third Street.

Dr. Clifford U. Collins, President of the Peoria Association of Commerce, attended the Waterway Convention at Little Rock.

Dr. William L. Ballenger, Chicago, who received an injury to his foot while returning from England a few weeks ago, has recovered.

Dr. and Mrs. A. C. Armbruster, who have spent the past year in North Carolina, have returned to their home in Collinsville, Ill.

Dr. Clarence L. Wheaton has been appointed physician in charge of the male service at Chicago Winfield Tuberculosis Sanatorium.

Dr. John M. Lang has been appointed instructor in clinical gynecology at the Illinois Post Graduate Medical School, Chicago.

Dr. and Mrs. F. E. Tulley, of Granite City, returned last week from a 5,000 mile automobile tour of New York and other eastern places.

Dr. A. D. Taylor, of Springfield, retired from active practice temporarily on July 1. He intends a prolonged rest until late in the winter.

Dr. D. A. Vanderhoof, of Rockford, Ill., is spending a year's vacation in Colorado Springs Colo., after which time he expects to locate there.

Dr. George Bley, of Beardstown, has gone to Chicago, where he will spend two weeks taking a post-graduate course in medicine and surgery.

Dr. E. E. Gelder, of Peoria, is in Europe, having gone abroad immediately after his wedding last spring. He will return in April, 1913.

Dr. G. F. Stericker, of Springfield, has secured Dr. H. T. Morton, of Kansas City, late interne at the Springfield Hospital, to assist him in his work.

Dr. G. Frank McLaren, of Whitehall, has been appointed surgeon for the Burlington Railroad; his territory is between Beardstown and St. Louis.

Dr. W. T. Bowman, of Moweaqua, Ill., has purchased the office and fixtures of the late Dr. James L. Lowrie, of Lincoln, and will locate in that city.

Dr. Joseph Young has been appointed medical advisor for women for the junior and senior years in the University of Chicago and the School of Education.

Dr. Charles P. Small has resigned as University Physician to the University of Chicago, and will hereafter devote his entire time to his special line of work.

Dr. R. L. Eddington, who has been practicing in Springerton for eight years, has left that village to take post-graduate instructions in Chicago and will locate elsewhere.

Dr. J. W. Dobson, of Bloomington, has purchased the property and practice of Dr. W. L. Bowman at Moweaqua, and will practice there. Dr. Dobson formerly resided there in 1894-95.

Dr. Frank W. Larrabee, formerly of Alton, was granted a divorce from his wife, Mrs. Bertha W. Larrabee, at Reno, Nev., September 23, on the grounds of extreme and repeated cruelty.

Dr. Barrett B. Griffith, one of the leading physicians of Springfield, who has been at Colorado Springs for the past two years, recovering from an infection of the foot, has returned and will resume practice in his new offices in the Hagler Building.

Dr. C. C. Hunt, of Dixon, has given up practice, and will, with Mrs. Hunt, go to Seattle, Wash., to spend the evening of his life. Dr. Hunt has been a well known practitioner in northern Illinois for many years, and will be greatly missed in his community.

REMOVALS

Dr. V. C. Morton, of Peoria, has removed to Rantoul.

Dr. S. O. Eads, of Decatur, has removed to Danville, Ky.

Dr. A. D. Steele, of Chester, has removed to LaJunta, Colo.

Dr. M. F. Savage, of Bloomington, has removed to Stanford, Ill.

Dr. F. W. Nickel has removed from Jacksonville to Eureka, Ill.

Dr. Jordan Parker, of Yates City, Ill., has removed to Normal, Ill.

Dr. J. B. Taylor has removed from Bloomington to Springfield, Ore.

Dr. Edmund P. Arens, of Longview, has removed to Detroit, Mich.

Dr. J. M. Threadgill has removed from New Douglas, Ill., to St. Louis, Mo.

Dr. H. W. Dale has removed from McLeansboro, Ill., to West Lebanon, Ind.

Dr. Hyde West has removed from Taylorville to 4503 N. Ashland Avenue, Chicago, Ill.

Dr. Lorenzo N. Grosvenor, of 1514 Cornelia Avenue, Chicago, has remover to Huron, South Dakota.

NEW INCORPORATION

Chicago Medical Association, Chicago; capital, $2,500; general drug business, also to operate a hospital; incorporators, David Apfelbaum, Edwin Logan Reeves, Harry A. Tiffany.

PUBLIC HEALTH

—The Department of Health in Elgin has opened a laboratory for the use of the physicians in that city.

—A clinic in defects of speech and voice has been added to the nose, throat and ear department of Rush Medical College, Chicago.

—The Department of Health, Chicago, has issued for distribution to physician and others interested a leaflet on anterior poliomyelitis, or infantile paralysis, outlining the safeguards against the spreading of the disease.

—The thirty-eighth annual meeting of the Mississippi Valley Medical Association was held at the Sherman House, Chicago, October 22-24, in accordance with the announcement published in THE JOURNAL for October. The splendid arrangements for the comfort and entertainment of the visiting members of the profession reflect the greatest credit on the members of the local committees in charge. Chicago has once more demonstrated that it is the convention city par excellence. The joint meeting with the Chicago Medical Society, Wednesday evening, was held in the Northwestern University Hall. Owing to illness the president of the Chicago Medical Society, Dr. Jacob Frank, was unable to be present. The secretary, Dr. P. J. H. Farrell, introduced Dr. Louis Frank, President of the Mississippi Valley Medical Association, who delivered the presidential address. Dr. Charles G. Stockton, of Buffalo, delivered the address in medicine, "The Stomach from the Standpoint of the General Practitioner, the Specialist and the Surgeon." Dr. George W. Crile, of Cleveland, delivered the address in surgery, "Biologic Interpretation of Abdominal Pain and Its Surgical Relation." The attendance at this session taxed the capacity of the large hall and the speakers received an ovation.

Among the exhibits, that of the Chicago Department of Health attracted much favorable attention. Dr. C. St. Clair Drake's ventilation

and baby death-rate models were the center of admiring and interested groups constantly.

The following officers were elected: President, Dr. Albert E. Sterne, Indianapolis, Ind.; First Vice-President, Dr. D'Orsay Hecht, Chicago; Second Vice-President, Dr. Hugh Cabot, Boston, Mass.; Secretary, Dr. Henry Enos Tuley, Louisville, Ky. (reelected); Treasurer, Dr. Samuel C. Stanton, Chicago (reelected). The Association accepted the invitation of New Orleans, and fixed the date of meeting as the last Tuesday, Wednesday and Thursday of October, 1913. The attendance at the sessions was more than 700, of which the usual one-third registered.

MARRIAGES

FREDERICK C. HANMORE, M.D., to Miss Vera Cleary, both of Chicago, October 2.

WILLIAM G. BEEK, M.D., to Miss Irene Wallace, both of Chicago, October 16.

ROY ROGERS, M.D., to Miss Bertha Andrews, both of Springfield, Ill., October 17.

HARRY JACKSON, M.D., to Miss Theresa Wertheimer, both of Chicago, September 10.

EDWIN EVERETT MADDEN, M.D., to Miss Marion Hyman, both of Chicago, recently.

WILLIAM FRANCIS DRYDEN, M.D., to Miss Edith E. Hall, both of Chicago, September 14.

JOHN HENRY EVANS, M.D., to Miss Camille Margaret Boileau, both of Chicago, September 23.

WILLIAM SHERMAN BOUGHER, M.D., to MARION S. WALLACE, M.D., both of Chicago, August 28.

ALEXANDER DONALD FERGUSON, M.D., to Miss Dorothy Williams, both of Chicago, September 25.

J. N. DEVINEY, M.D., of Champaign, to Miss Madge L. Wilson, of Philo, Ill., September 24, 1912.

GEORGE H. STACY, M.D., and Miss Anna Victoria Ridgway, both of Jacksonville, Ill., were married October 9.

J. M. BOHAN, M.D., of Galesburg, Ill., was united in marriage to Miss Florence Lynch, of Monmouth, September 24.

WILLIAM BUCKLEY PECK, M.D., Freeport, Ill., to Miss Alvina Scherf, of Rockford, Ill., in Chicago, September 26.

JOHN QUINCE ROANE, M.D., of Carlyle, was married to Miss Nellie Gertrude Steele, of Whitewater, Wis., October 9.

L. L. YERKES, M.D., of Upper Alton, Ill., to Miss Cora Wright, of Upper Alton, October 15, 1912, at Edwardsville, Ill.

WILLIAM WEIRICH, M.D., formerly of Alton, but recently of Jacksonville, was married to Miss Virginia Walker, of Waterloo, Ia., recently.

FRANK W. LARRABEE, M.D., formerly of Alton, but later of Reno, Nev., was married in October to Miss Ella Smith, of Clairemont, N. H.

T. W. CURRY, M.D., of Streator, Ill., was married September 21, to Miss Eveline Edwards, of Ruth, North Wales; the wedding ceremony was performed in that city. Dr. Curry and wife will return to Streator to reside.

DEATHS

ALBERT GALLATIN JONES, M.D., died at his home in Lexington, Ill., Wednesday, September 18, 1912, aged 85.

JAMES R. CALDWELL, M.D., Harvey Medical College, Chicago, 1898; of Chicago; died at his home September 21, from myocarditis; aged 68.

EDWARD M. FULLER, M.D., Hahnemann Medical College, Chicago, 1890; a member of the American Medical Association; died at his home in Chicago, October 3; aged 70.

BENJAMIN GRIFFITH MILLER, M.D., died at his home in the Smith Hotel at Pontiac, Tuesday, September 24, 1912; age 80. Death was due to Bright's disease and old age.

W. E. FITZGIBBONS, M.D., a practitioner of Wataga until about two years ago, died at St. Mary's Hospital, La Salle, Ill., October 3, 1912; aged 53. Death was due to heart trouble.

J. B. RIGNEY, M.D., of Arthur, for more than forty years a practitioner of that place, died September 24, 1912, aged 72. His death was due to muscular spasm of the diaphragm following an attack of paralysis.

JAMES C. HALLOWAY, M.D., Homeopathic Medical College of Missouri, St. Charles, 1886; of Galesburg, Ill.; formerly a clergyman of the Christian Church; died after a surgical operation, August 25, in a Chicago Hospital.

JEAN I. GLIDDEN, M.D., of Mt. Carroll, died at the Globe Hospital, Freeport, Ill., October 14; aged 52. Death was due to severe burns which Dr. Glidden sustained last spring when a pot of paint which she had placed on the stove to warm became ignited.

GEORGE HUNTIN GROBER, M.D., College of Physicians and Surgeons, Chicago, 1909; a member of the Illinois State Medical Society; formerly of Chicago and later of Kelliher, Minn.; was found dead in his room in a hotel in Wadena, September 2, from the effects of an overdose of morphin; aged 24.

GEORGE FROST, M.D., Dearborn Medical College, Chicago, 1906; of Chicago; a member of the Illinois State Medical Society; instructor in clinical surgery in his alma mater and an employee of the health department of Chicago; died in the Chicago Avenue Hospital, September 9, after an operation for malignant disease of the throat; aged 51.

FRED G. CRETORS, M.D., of Paris, Ill., died at the Michael Reese Hospital, Chicago, Ill., October 18. Although a sufferer from diabetes for some time, his death was unexpected. He was born in Paris, Ill., July 7, 1867; in 1897 he entered the Chicago Homeopathic Medical College, and graduated from that institution in 1901. He practiced for a short time at Mason City, Ill., later removing to Paris, where he has since been located.